

# FLOOD INSURANCE STUDY

## FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



### CALDWELL COUNTY, TEXAS

#### AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
CALDWELL COUNTY, UNINCORPORATED AREAS	480094
LOCKHART, CITY OF	480095
LULING, CITY OF	480096
MARTINDALE, CITY OF	481587
MUSTANG RIDGE, CITY OF	481687
NIEDERWALD, CITY OF	481670
SAN MARCOS, CITY OF	485505
UHLAND, TOWNSHIP OF	481668



# FEMA

**PRELIMINARY**  
**4/7/2017**

**REVISED:**

FLOOD INSURANCE STUDY NUMBER  
48055CV000B

Version Number 2.3.3.3

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Campbell Creek	06-07 P
Little West Fork	08 P
Martindale Diversion	09a-09b P
Mebane Creek	10-11 P
Plum Creek	12 P
San Marcos River	13-22a P
Seals Creek	23-24 P
Seals Creek Tributary	25 P
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Stream BPC-2	25b P
Stream TB-1	26 P
Tenney Creek	27-28 P
Town Branch	29-32 P
West Fork Plum Creek	33 P

## Published Separately

Flood Insurance Rate Map (FIRM)

# **FLOOD INSURANCE STUDY REPORT CALDWELL COUNTY, TEXAS**

## **SECTION 1.0 – INTRODUCTION**

### **1.1 The National Flood Insurance Program**

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal

Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as "Post-FIRM" buildings.

## 1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) Report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community's regulations.

## 1.3 Jurisdictions Included in the Flood Insurance Study Project

This FIS Report covers the entire geographic area of Caldwell County, Texas.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the United States Geological Survey (USGS) 8-digit Hydrologic Unit Code (HUC-8) sub-basins affecting each, are shown in Table 1. The FIRM panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

**Table 1: Listing of NFIP Jurisdictions**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Caldwell County, Unincorporated Areas	480094	12090301, 12100202, 12100203	48055C0025E 48055C0050E 48055C0069F	

**Table 1: Listing of NFIP Jurisdictions, continued**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Caldwell County, Unincorporated Areas (continued)	480094	12090301, 12100202, 12100203	48055C0100E 48055C0115E 48055C0120E 48055C0125E 48055C0150E 48055C0175E 48055C0182F 48055C0205F 48055C0210F 48055C0215F 48055C0220F 48055C0235E 48055C0250E 48055C0275E 48055C0300E 48055C0325E 48055C0335F 48055C0355F 48055C0360F 48055C0365F 48055C0370F 48055C0400F 48055C0425E	
Lockhart, City of	480095	12100203	48055C0115E 48055C0120E 48055C0235E 48055C0250E 48055C0275E	
Luling, City of <sup>1</sup>	480096	12100203	48055C0360F 48055C0365F 48055C0370F 48055C0400F	Guadalupe County FIS, 2007
Martindale, City of	481587	12100203	48055C0205F 48055C0210F	
Mustang Ridge, City of <sup>1</sup>	481687	12090301, 12100203	48055C0025E	Travis County FIS, 2016

**Table 1: Listing of NFIP Jurisdictions, continued**

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
Niederwald, City of <sup>1</sup>	481670	12100203	48055C0025E 48055C0100E 48055C0125E	Hays County FIS, 2005
San Marcos, City of <sup>1</sup>	485505	12100203	48055C0069F 48055C0100E 48055C0182F 48055C0205F	Hays County FIS, 2005
Uhland, Township of <sup>1</sup>	481668	12100203	48055C0100E	Hays County FIS, 2005

<sup>1</sup> Community is mapped in multiple counties. This FIS only covers the portion within Caldwell County

#### **1.4 Considerations for using this Flood Insurance Study Report**

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, "Map Repositories," within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for



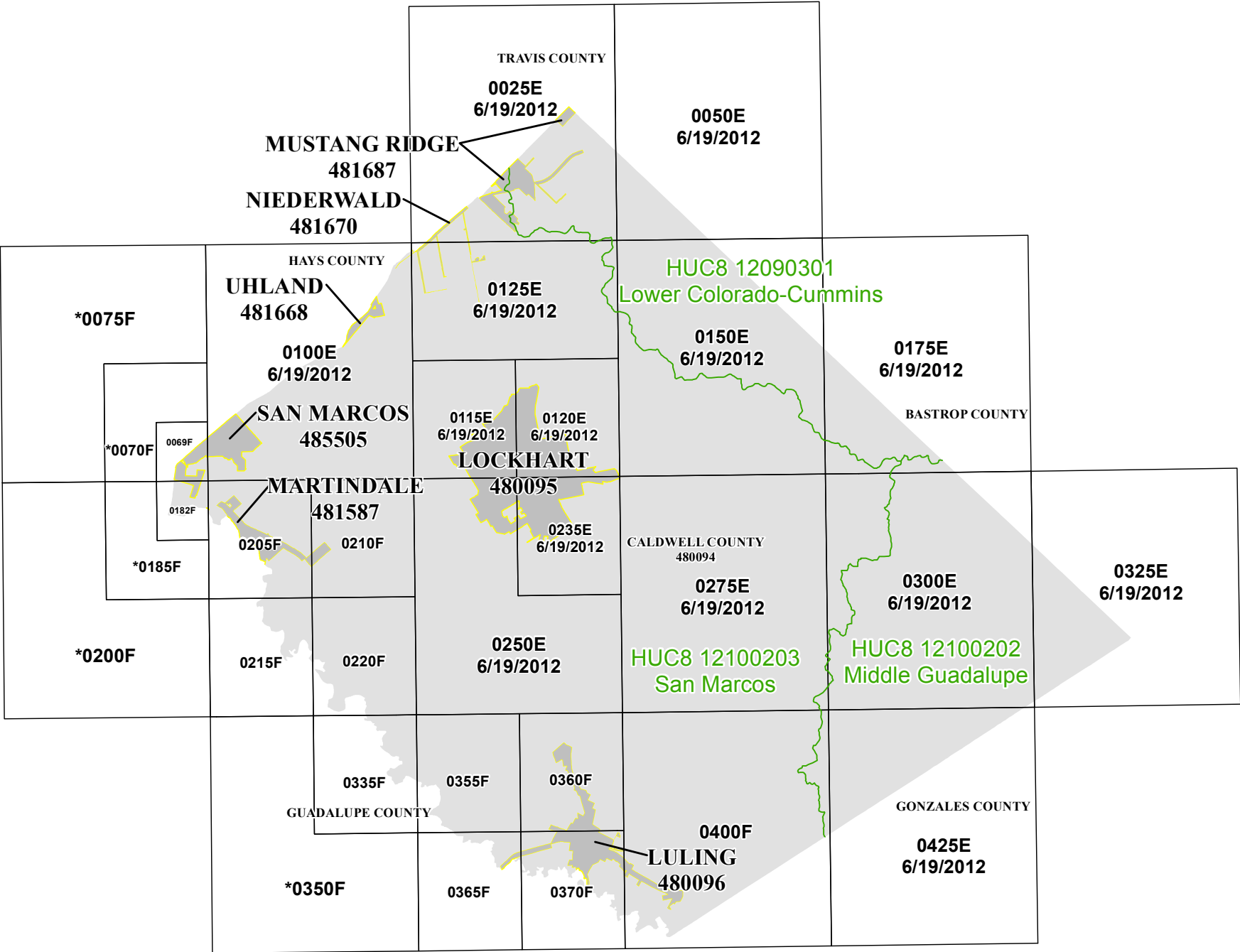
jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

The initial Countywide FIS Report for Caldwell County became effective on June 19, 2012. Refer to Table 28 for information about subsequent revisions to the FIRMs.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at [www.fema.gov/online-tutorials](http://www.fema.gov/online-tutorials).

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Caldwell County, and also displays the panel number and effective date for each FIRM panel in the county. Other information shown on the FIRM Index includes community boundaries, watershed boundaries, and USGS HUC-8 codes.

Figure 1: FIRM Panel Index



**ATTENTION:** The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before 6/19/2012

N

1 inch = 26,262 feet

1:315,141

0 14,000 28,000 56,000

Feet

Map Projection:  
State Plane Lambert Conformal Conic, Texas South Central Zone FIPS 4204; North American Datum 1983

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT  
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

\*PANEL NOT PRINTED - AREA NOT INCLUDED



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP PANEL INDEX

CALDWELL COUNTY, TEXAS

PANELS PRINTED: 0025, 0050, 0069, 0100, 0115, 0120, 0125, 0150, 0175, 0182, 0205, 0210, 0215, 0220, 0235, 0250, 0275, 0300, 0325, 0335, 0355, 0360, 0365, 0370, 0400, 0425

FEDERAL EMBLEM

FEMA

MAP NUMBER  
48055CIND0B

MAP REVISED

PRELIMINARY

4/7/2017

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

**Figure 2: FIRM Notes to Users**

## **NOTES TO USERS**

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Flood Map Service Center website at [msc.fema.gov](http://msc.fema.gov). Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Flood Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Flood Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

**PRELIMINARY FIS REPORT:** FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting, or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

**BASE FLOOD ELEVATIONS:** For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Non-Coastal Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

**FLOODWAY INFORMATION:** Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

**Figure 2. FIRM Notes to Users, (continued)**

**FLOOD CONTROL STRUCTURE INFORMATION:** Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

**PROJECTION INFORMATION:** The projection used in the preparation of the map was Texas State Plane South Central Zone (FIPSZONE 4204). The horizontal datum was the North American Datum of 1983, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

**ELEVATION DATUM:** Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at [www.ngs.noaa.gov/](http://www.ngs.noaa.gov/) or contact the National Geodetic Survey at the following address:

*NGS Information Services  
NOAA, N/NGS12  
National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, Maryland 20910-3282  
(301) 713-3242*

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

**BASE MAP INFORMATION:** Base map information shown on the FIRM was provided by TxDOT, the city of San Marcos and U.S. Department of Commerce. For information about base maps, refer to Section 6.2 "Base Map" in this FIS Report.

The map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

## **NOTES FOR FIRM INDEX**

**REVISIONS TO INDEX:** As new studies are performed and FIRM panels are updated within Caldwell County, Texas, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 28 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

**Figure 2. FIRM Notes to Users, (continued)**

**ATTENTION:** The corporate limits shown on this FIRM Index are based on the best information available at the time of publication. As such, they may be more current than those shown on FIRM panels issued before 6/19/2012.

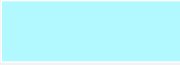
**SPECIAL NOTES FOR SPECIFIC FIRM PANELS**

This Notes to Users section was created specifically for Caldwell County, Texas, effective Month, xx, xxxx.






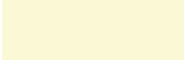

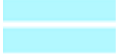











**FLOOD RISK REPORT:** A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Caldwell County.




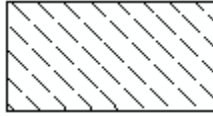

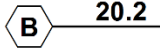
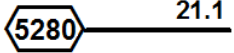

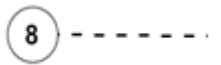


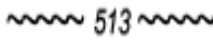
**Figure 3: Map Legend for FIRM**

<p><b>SPECIAL FLOOD HAZARD AREAS:</b> <i>The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.</i></p>	
	Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)
Zone A	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
Zone AE	The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone.
Zone AH	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
Zone AO	The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
Zone AR	The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
Zone A99	The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
Zone V	The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
Zone VE	Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.

**Figure 3: Map Legend for FIRM, (continued)**











	Regulatory Floodway determined in Zone AE.
<b>OTHER AREAS OF FLOOD HAZARD</b>	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood.
	Area with Flood Risk due to Levee: Areas where a non-accredited levee, dike, or other flood control structure is shown as providing protection to less than the 1% annual chance flood.
<b>OTHER AREAS</b>	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.
	Unshaded Zone X: Areas of minimal flood hazard.
<b>FLOOD HAZARD AND OTHER BOUNDARY LINES</b>	
  (ortho)      (vector)	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
<b>GENERAL STRUCTURES</b>	
    Aqueduct Channel Culvert Storm Sewer	Channel, Culvert, Aqueduct, or Storm Sewer
   Dam Jetty Weir	Dam, Jetty, Weir

**Figure 3: Map Legend for FIRM, (continued)**

	Levee, Dike, or Floodwall
 Bridge	Bridge
<b>COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA):</b> <i>CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.</i>	
 <b>CBRS AREA</b> <b>09/30/2009</b>	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
 <b>OTHERWISE PROTECTED AREA</b> <b>09/30/2009</b>	Otherwise Protected Area
<b>REFERENCE MARKERS</b>	
 22.0	River mile Markers
<b>CROSS SECTION &amp; TRANSECT INFORMATION</b>	
 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
 17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
 8	Coastal Transect
 	<p>Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.</p> <p>Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.</p>
 513	Base Flood Elevation Line
<b>ZONE AE</b> <b>(EL 16)</b>	Static Base Flood Elevation value (shown under zone label)



**Figure 3: Map Legend for FIRM, (continued)**

<b>ZONE AO (DEPTH 2)</b>	Zone designation with Depth
<b>ZONE AO (DEPTH 2) (VEL 15 FPS)</b>	Zone designation with Depth and Velocity
<b>BASE MAP FEATURES</b>	
 <i>Missouri Creek</i>	River, Stream or Other Hydrographic Feature
	Interstate Highway
	U.S. Highway
	State Highway
	County Highway
 <b>MAPLE LANE</b>	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
 <b>RAILROAD</b>	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
	Secondary Grid Crosshairs
<b>Land Grant</b>	Name of Land Grant
<b>7</b>	Section Number
<b>R. 43 W. T. 22 N.</b>	Range, Township Number
<b><sup>42</sup>76<sup>000m</sup>E</b>	Horizontal Reference Grid Coordinates (UTM)
<b>365000 FT</b>	Horizontal Reference Grid Coordinates (State Plane)
<b>80° 16' 52.5"</b>	Corner Coordinates (Latitude, Longitude)

## **SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS**

### **2.1 Floodplain Boundaries**

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Caldwell County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 23), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Caldwell County, respectively.

Table 2, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 13. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic

data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

**Table 2: Flooding Sources Included in this FIS Report**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Bear Gulch	Caldwell County, Unincorporated Areas	Confluence with Sandy Fork	2.57 miles upstream of confluence with Sandy Fork	12100202	2.57	N/A	N	A	1980
Bee Creek	Caldwell County, Unincorporated Areas	Hays-Caldwell County Boundary	0.98 miles upstream of FM Road 86	12090301	4.13	N/A	N	A	1980
Big Sandy Branch	Caldwell County, Unincorporated Areas	Confluence with Sandy Fork	2.39 miles upstream of County Road 617	12100202	4.38	N/A	N	A	1980
Big West Fork	Caldwell County, Unincorporated Areas	State Highway 130	0.83 miles upstream of County Road 109	12100203	1.7	N/A	Y	A	1980
Big West Fork	Caldwell County, Unincorporated Areas	Confluence with Little West Fork and West Fork Plum Creek	State Highway 130	12100203	0.87	N/A	Y	AE	1980
Boggy Creek	Caldwell County, Unincorporated Areas; Lockhart, City of	Confluence with Clear Fork Plum Creek	0.89 miles upstream of County Road 230	12100203	6.01	N/A	N	A	1980
Brushy Branch	Caldwell County, Unincorporated Areas	Confluence with Clear Fork Plum Creek	0.61 miles upstream of County Road 209	12100203	2.68	N/A	N	A	1980
Brushy Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	Camino Real Highway	12100203	0.93	N/A	Y	AE	1995
Brushy Creek #2	Caldwell County, Unincorporated Areas	Confluence with Hollow Pool	0.82 miles upstream of FM Road 1854	12090301	4.23	N/A	N	A	1980
Buck Branch	Caldwell County, Unincorporated Areas	Guadalupe-Caldwell County Boundary	0.85 miles upstream of County Road 1151	12100202	1.75	N/A	N	A	1980

**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Bypass Creek	Caldwell County, Unincorporated Areas; San Marcos, City of	Confluence with San Marcos River	State Highway 21	12100203	3.2	N/A	Y	AE	2016
Callihan Creek	Caldwell County, Unincorporated Areas	Confluence with San Marcos River	1.24 miles upstream of County Road 111	12100203	6.5	N/A	N	A	1980
Campbell Creek	Caldwell County, Unincorporated Areas	Limit of Detailed Study	1.2 miles upstream of Limit of Detailed Study	12100203	1.21	N/A	N	A	1980
Campbell Creek	Caldwell County, Unincorporated Areas	Confluence with Tenney Creek	0.65 miles upstream of Sand Hill Road	12100202	1.88	N/A	Y	AE	1980
Cat Branch	Caldwell County, Unincorporated Areas	Bastrop-Caldwell County Boundary	2.3 miles upstream of FM Road 20	12090301	3.12	N/A	N	A	1980
Cedar Creek	Caldwell County, Unincorporated Areas; Mustang Ridge, City of	Bastrop-Caldwell County Boundary	1.0 miles upstream of County Road 177	12090301	6.74	N/A	N	A	1980
Chalk Hollow	Caldwell County, Unincorporated Areas	Gonzales-Caldwell County Boundary	0.14 miles upstream of County Road 152	12100202	2.42	N/A	N	A	1980
Clear Fork Plum Creek	Caldwell County, Unincorporated Areas; Lockhart, City of	Confluence with Plum Creek	Hays-Caldwell County Boundary	12100203	22.6	N/A	N	A	1980
Copperas Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	0.68 miles upstream of County Road 609	12100203	4.69	N/A	N	A	1980
Copperas Creek	Caldwell County, Unincorporated Areas	Gonzales-Caldwell County Boundary	0.36 miles upstream of FM Road 713	12100202	6.96	N/A	N	A	1980

**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Cottonwood Creek	Caldwell County, Unincorporated Areas	Confluence with Cry Creek	2.64 miles upstream of confluence with Dry Creek	12100203	2.64	N/A	N	A	1980
Cowpen Creek	Caldwell County, Unincorporated Areas; Mustang Ridge, City of; Niederwald, City of	Confluence with Elm Creek	Hays-Caldwell County Boundary	12100203	7.72	N/A	N	A	1980
Crooked Branch	Caldwell County, Unincorporated Areas	Confluence with Callihan Creek	1.31 miles upstream of County Road 111	12100203	2.83	N/A	N	A	1980
Daniels Creek	Caldwell County, Unincorporated Areas	Confluence with Tenney Creek	0.88 miles upstream of FM Road 713	12100203	5.66	N/A	N	A	1980
Devil Hollow	Caldwell County, Unincorporated Areas	Confluence with Sandy Fork	1.57 miles upstream of FM Road 713	12100202	1.67	N/A	N	A	1980
Dickerson Creek	Caldwell County, Unincorporated Areas	Confluence with San Marcos River	1.9 miles upstream of County Road 107	12100203	7.04	N/A	N	A	1980
Dry Branch	Caldwell County, Unincorporated Areas	Confluence with Clear Fork Plum Creek	0.21 miles upstream of County Road 644	12100203	7.99	N/A	N	A	1980
Dry Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	2.71 miles upstream of County Road 1179	12100203	12.37	N/A	N	A	1980
Dry Creek #2	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	0.61 miles upstream of County Road 158	12100203	9.9	N/A	N	A	1980
Elm Creek	Caldwell County, Unincorporated Areas; Niederwald, City of	Confluence with Plum Creek	Hays-Caldwell County Boundary	12100203	8.38	N/A	N	A	1980

**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Haggai Creek	Caldwell County, Unincorporated Areas	Confluence with Walnut Creek	0.83 miles upstream of County Road 257	12090301	3.96	N/A	N	A	1980
Haw Branch	Caldwell County, Unincorporated Areas	Confluence with Dry Creek #2	0.45 miles upstream of County Road 160	12090301	2.95	N/A	N	A	1980
Hemphill Creek	Caldwell County, Unincorporated Areas; Martindale, City of	Confluence with Morrison Creek	Hays-Caldwell County Boundary	12100203	6.97	N/A	N	A	1980
Hines Branch	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	4.05 miles upstream of County Road 141	12100203	5.83	N/A	N	A	1980
Hollow Pool	Caldwell County, Unincorporated Areas	Confluence with Brushy Creek #2	2.04 miles upstream of FM Road 672	12090301	2.15	N/A	N	A	1980
House Log Branch	Caldwell County, Unincorporated Areas	Confluence with Dry Creek #2	1.27 miles upstream of County Road 162	12100203	1.45	N/A	N	A	1980
Jerry Creek	Caldwell County, Unincorporated Areas	Confluence with Dry Creek	0.34 miles upstream of County Road 179	12100203	4.62	N/A	N	A	1980
Linscome Creek	Caldwell County, Unincorporated Areas	Confluence with Dry Creek #2	1.51 miles upstream of County Road 179	12100203	4.22	N/A	N	A	1980
Little West Fork	Caldwell County, Unincorporated Areas	Confluence with West Fork Plum Creek and Big West Fork	10 feet upstream of Long Road	12100203	0.45	N/A	Y	AE	1980
Little West Fork	Caldwell County, Unincorporated Areas	Limit of Detailed Study	0.68 miles upstream of Limit of Detailed Study	12100203	0.68	N/A	N	A	1980
Lytton Creek	Caldwell County, Unincorporated Areas	Bastrop-Caldwell County Boundary	0.89 miles upstream of County Road 172	12090301	3.57	N/A	N	A	1980
Lytton Springs Creek	Caldwell County, Unincorporated Areas	Bastrop-Caldwell County Boundary	1.49 miles upstream of County Road 174	12090301	3.86	N/A	N	A	1980

**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Martindale Diversion	Caldwell County, Unincorporated Areas; Martindale, City of	Confluence with San Marcos River	FM Road 1979	12100203	4.09	N/A	Y	AE	2016
McNeil Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	1.27 mile upstream of County Road 130	12100203	6.62	N/A	N	A	1980
Mebane Creek	Caldwell County, Unincorporated Areas; Lockhart, City of	0.4 miles downstream of FM Road 20	60 feet upstream of Clear Fork Road	12100203	1.15	N/A	Y	AE	1989
Mebane Creek	Caldwell County, Unincorporated Areas; Lockhart, City of	Confluence with Clear Fork Plum Creek	1.76 miles downstream of FM Road 20	12100203	1.38	N/A	N	A	1980
Morrison Creek	Caldwell County, Unincorporated Areas; Martindale, City of	Confluence with Hemphill Creek	1.8 miles upstream of County Road 238	12100203	4.68	N/A	N	A	1980
Mule Creek	Caldwell County, Unincorporated Areas	Gonzales-Caldwell County Boundary	0.85 miles upstream of Gonzales-Caldwell County Boundary	12100203	0.85	N/A	N	A	1980
Pecan Branch	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	4.19 miles upstream of Confluence with Plum Creek	12100203	4.19	N/A	N	A	1980
Pin Oak Creek	Caldwell County, Unincorporated Areas	Confluence with West Fork Plum Creek	3.34 miles upstream of County Road 114	12100203	6.79	N/A	N	A	1980



**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Plum Creek	Uhland, Township of	1,400 feet downstream of the Hays-Caldwell County Boundary	Hays-Caldwell County Boundary	12100203	0.24	N/A	Y	AE	1995
Plum Creek	Caldwell County, Unincorporated Areas; Lockhart, City of; Luling, City of; Uhland, Township of	1.05 miles upstream of Gonzales-Caldwell County Boundary	Hays-Caldwell County Boundary	12100203	39.7	N/A	N	A	1980
Rabbit Branch	Caldwell County, Unincorporated Areas	Confluence with Elm Creek	1.62 miles upstream of County Road 221	12100203	1.85	N/A	N	A	1980
Salt Branch	Caldwell County, Unincorporated Areas; Luling, City of	Confluence with Plum Creek	0.32 miles upstream of FM Road 2984	12100203	7.12	N/A	N	A	1980
San Marcos River	Caldwell County, Unincorporated Areas; Luling, City of; Martindale, City of	Confluence with Plum Creek	800 feet upstream of FM Road 266	12100203	47.57	N/A	Y	AE	2016
Sandy Fork	Caldwell County, Unincorporated Areas	Gonzales-Caldwell County Boundary	0.98 miles upstream of Confluence with Devil Hollow	12100202	14.57	N/A	N	A	1980
Scruggs Creek	Caldwell County, Unincorporated Areas	Confluence with Sandy Fork	0.76 miles upstream of County Road 301	12100202	3.23	N/A	N	A	1980
Seals Creek	Caldwell County, Unincorporated Areas; Luling, City of	US Highway 90	40 feet upstream of State Highway 80	12100230	3.21	N/A	Y	AE	1980
Seals Creek	Caldwell County, Unincorporated Areas	State Highway 80	FM Road 20	12100203	10.2	N/A	N	A	1980
Seals Creek Tributary	Caldwell County, Unincorporated Areas	Confluence with Seals Creek	25 feet upstream of State Highway 80	12100203	0.45	N/A	Y	AE	1980

**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Seals Creek Tributary	Caldwell County, Unincorporated Areas	25 feet upstream of State Highway 80	5,055 feet upstream of State Highway 80	12100203	0.97	N/A	N	A	1980
Sixmile Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	2.8 miles upstream of County Road 197	12100203	4.49	N/A	N	A	1980
Spanish Oak Creek	Caldwell County, Unincorporated Areas	Confluence with Dry Creek #2	1.1 miles upstream of County Road 159	12100203	2.97	N/A	N	A	1980
Stream BPC-1	San Marcos, City of	Confluence with Bypass Creek	Caldwell County boundary	12100203	0.05	N/A	Y	AE	2016
Stream BPC-2	San Marcos, City of	Confluence with Bypass Creek	Caldwell County boundary	12100203	0.07	N/A	Y	AE	2016
Stream TB-1	Lockhart, City of	Confluence with Town Branch	Divergence from Town Branch	12100203	0.47	N/A	Y	AE	1989
Tenney Creek	Caldwell County, Unincorporated Areas	1.5 miles downstream of FM 3158	0.7 miles upstream of FM Road 713	12100203	2.54	N/A	Y	AE	1980
Tenney Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	1.5 miles downstream of FM 3158	12100203	6.13	N/A	N	A	1980
Tenney Creek	Caldwell County, Unincorporated Areas	0.7 miles upstream of FM Road 713	1.8 miles upstream of FM Road 713	12100203	1.81	N/A	N	A	1980
Town Branch	Caldwell County, Unincorporated Areas; Lockhart, City of	500 feet downstream of Union Pacific Railroad	1.0 miles upstream of Pecos Street	12100203	3.18	N/A	Y	AE	1989
Walnut Creek	Caldwell County, Unincorporated Areas	Caldwell County Boundary	2.8 miles upstream of Confluence with FM Road 1854	12090301	10.36	N/A	N	A	1980
West Fork Plum Creek	Caldwell County, Unincorporated Areas	Confluence with Plum Creek	FM Road 20	12100203	18.99	N/A	N	A	1980

**Table 2: Flooding Sources Included in this FIS Report, (continued)**

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi <sup>2</sup> ) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
West Fork Plum Creek	Caldwell County, Unincorporated Areas	FM Road 20	Confluence of Little West Fork and Big West Fork	12100203	0.37	N/A	Y	AE	1980

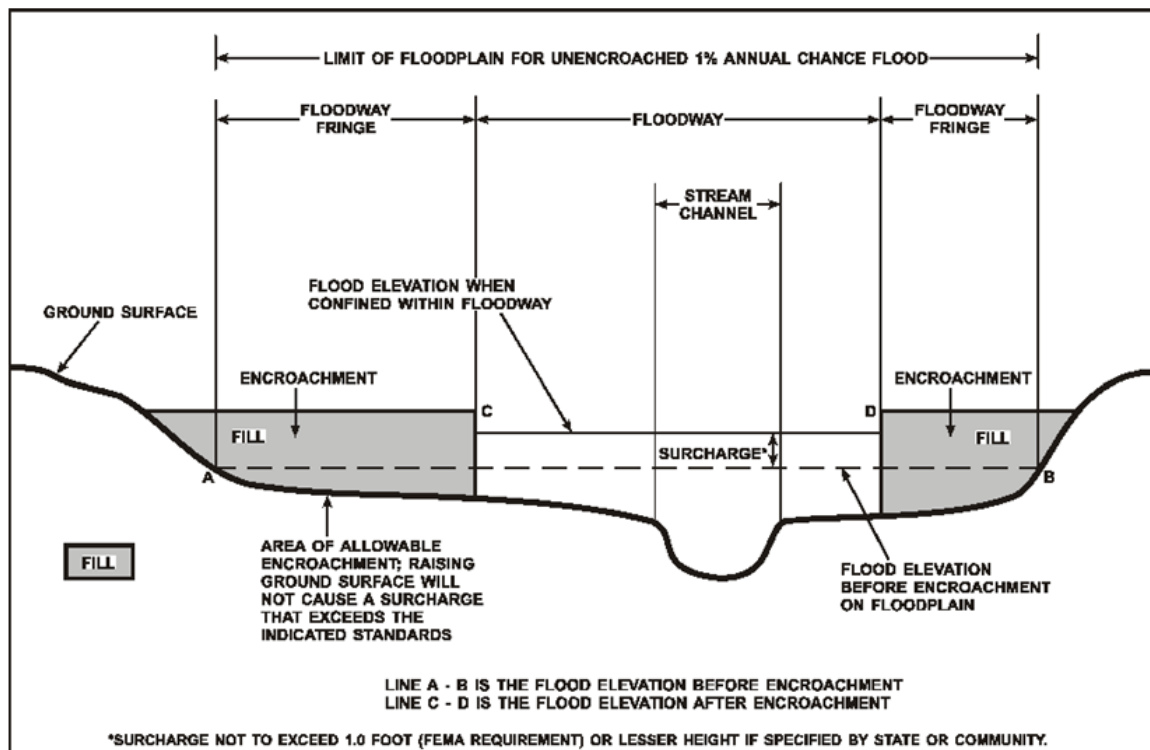
## 2.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

**Figure 4: Floodway Schematic**



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments, floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

All floodways that were developed for this Flood Risk Project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

## **2.3 Base Flood Elevations**

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

## **2.4 Non-Encroachment Zones**

This section is not applicable to this Flood Risk Project.

## **2.5 Coastal Flood Hazard Areas**

This section is not applicable to this Flood Risk Project.

### **2.5.1 Water Elevations and the Effects of Waves**

This section is not applicable to this Flood Risk Project.

### **Figure 5: Wave Runup Transect Schematic**

**[Not Applicable to this Flood Risk Project]**

### **2.5.2 Floodplain Boundaries and BFEs for Coastal Areas**

This section is not applicable to this Flood Risk Project.

### 2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

#### Figure 6: Coastal Transect Schematic

[Not Applicable to this Flood Risk Project]

### 2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk Project.

## SECTION 3.0 – INSURANCE APPLICATIONS

### 3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Caldwell County.

Figure 3, “Map Legend for FIRM.” Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in Caldwell County.

**Table 3: Flood Zone Designations by Community**

Community	Flood Zone(s)
Caldwell County, Unincorporated Areas	A, AE, X
Lockhart, City of	A, AE, X
Luling, City of	A, AE, X
Martindale, City of	A, AE, X
Mustang Ridge, City of	A, X
Niederwald, City of	A, X
San Marcos, City of	A, AE, X
Uhland, Township of	A, AE, X

### 3.2 Coastal Barrier Resources System

This section is not applicable to this Flood Risk Project.

**Table 4: Coastal Barrier Resources System Information**

**[Not Applicable to this Flood Risk Project]**

## SECTION 4.0 – AREA STUDIED

### 4.1 Basin Description

Table 5 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

**Table 5: Basin Characteristics**

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
Lower Colorado-Cummins	12090301	Colorado River	Begins at the confluence of the Colorado River and Onion Creek, extends southwest, affecting the northeast one eighth of Caldwell County, as well as portions of Austin, Bastrop, Colorado, Fayette, Lee, Travis, Washington and Williamson counties.	2,196
Middle Guadalupe	12100202	Guadalupe River	Begins at the upstream limit of the Guadalupe River, extends southeast, affecting one half of the eastern half of Caldwell County, as well as portions of Bastrop, Comal, DeWitt, Fayette, Gonzales, Guadalupe, Karnes and Wilson counties.	2,138
San Marcos	12100203	Blanco River and San Marcos River	Begins at upstream limit of the Blanco River, extends southeast, affecting a majority of Caldwell County, as well as portions of Blanco, Comal, Gonzales, Guadalupe, Hays, Kendall and Travis counties.	1,359

## 4.2 Principal Flood Problems

Table 6 contains a description of the principal flood problems that have been noted for Caldwell County by flooding source.

**Table 6: Principal Flood Problems**

Flooding Source	Description of Flood Problems
San Marcos River and tributaries	The San Marcos River and its tributaries within Caldwell County flow through predominantly rural areas. Flooding mostly occurs to cropland and pastureland. However, larger floods in the past have caused damage to residential property. Topography of the area is nearly level to moderately steep and the soils have a wide range of permeability. Most flood-producing storms occur in the spring and fall, although intense local thunderstorms can produce flooding throughout the year.

Table 7 contains information about historic flood elevations in the communities within Caldwell County.

**Table 7: Historic Flooding Elevations**

Flooding Source	Location	Historic Peak (Feet NAVD88)	Event Date	Approximate Recurrence Interval (years)	Source of Data
San Marcos River	FM 1977 Crystal Clear WSC Staples Well	481.9	2015	100	GBRA High Water Marks

## 4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within Caldwell County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

**Table 8: Non-Levee Flood Protection Measures**

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Campbell Creek	Site No. 29	Dam	0.7 miles upstream of Sand Hill Rd	Floodwater retarding dams constructed by the National Resource Conservation Service
Mebane Creek	N/A	Dam	862 feet upstream of State Route 20	Flood retention dam
San Marcos River	Old Cotton Mill Dam	Dam	At station 375,204 along San Marcos River	



**Table 8: Non-Levee Flood Protection Measures, (continued)**

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
San Marcos River	N/A	Dam	At station 190,714 along San Marcos River	
Tenney Creek	Site No. 28	Dam	0.7 miles upstream of FM 713	Floodwater retarding dams constructed by the National Resource Conservation Service

#### **4.4 Levees**

This section is not applicable to this Flood Risk Project.

**Table 9: Levees**

**[Not Applicable to this Flood Risk Project]**

## **SECTION 5.0 – ENGINEERING METHODS**

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

In addition to these flood events, the “1-percent-plus”, or “1%+”, annual chance flood elevation has been modeled and included on the flood profile for certain flooding sources in this FIS Report. While not used for regulatory or insurance purposes, this flood event has been calculated to help illustrate the variability range that exists between the regulatory 1% annual chance flood elevation and a 1% annual chance elevation that has taken into account an additional amount of uncertainty in the flood discharges (thus, the 1% “plus”). For flooding sources whose discharges were estimated using regression equations, the 1%+ flood elevations are derived by taking the 1% annual chance flood

discharges and increasing the modeled discharges by a percentage equal to the average predictive error for the regression equation. For flooding sources with gage- or rainfall-runoff-based discharge estimates, the upper 84-percent confidence limit of the discharges is used to compute the 1%+ flood elevations.

## **5.1 Hydrologic Analyses**

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. Stream gage information is provided in Table 12.

**Table 10: Summary of Discharges**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Annual Chance Future	0.2% Annual Chance
Big West Fork	Confluence with Little West Fork	3.15	2,176	*	3,048	3,479	*	4,366
Big West Fork	Upper limit of detailed study	2.85	1,970	*	2,757	3,177	*	3,986
Brushy Creek	Upstream of State Highway 80	*	*	*	*	27,000 <sup>1</sup>	*	*
Brushy Creek	Approximately 3,450 feet downstream from State Highway 21	21.79	4,140	*	7,720	9,640	*	15,070
Brushy Creek	Shallow Flooding Area Upstream of Missouri-Kansas-Texas Railroad	*	*	*	*	7,000 <sup>1</sup>	*	*
Bypass Creek	At San Marcos River	7.44	2,790	*	5,060	6,260	*	88,470
Bypass Creek	At Missouri-Kansas-Texas Railroad	5.96	2,410	*	4,270	5,260	*	52,320
Bypass Creek	Downstream of tributary of State Highway 21	4.36	1,960	*	3,360	4,110	*	52,320
Bypass Creek	At State Highway 21 (County Line)	3.32	1,630	*	2,730	3,320	*	52,320
Campbell Creek	At confluence with Tenney Creek	5.66	386	*	569	746	*	955

**Table 10: Summary of Discharges, (continued)**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Annual Chance Future	0.2% Annual Chance
Campbell Creek	Below SCS Dam Site No. 29	4.88	55	*	61	65	*	143
Little West Fork	Confluence with Big West Fork	3.54	2,446	*	3,424	3,911	*	4,907
Martindale Diversion	At San Marcos River	539.68	*	*	*	35,066	*	*
Mebane Creek	Downstream of Clear Fork Street	0.62	685	*	1,001	1,165	*	1,370
Mebane Creek	Downstream of dam located 800 feet upstream of FM 20	1.12	666	*	1,482	1,858	*	2,367
Mebane Creek	Downstream of dam located 3,400 feet downstream of FM 20	1.55	1,139	*	1,633	1,998	*	2,944
Mebane Creek	Upstream of confluence with Clear Fork Plum Creek	2.46	1,172	*	2,391	2,869	*	4,046
San Marcos River	At Luling gage	838.9	47,410	*	103,870	142,430	*	253,130
San Marcos River	Parallel to Martindale Diversion	*	42,850	*	77,230	95,220	*	124,430
Seals Creek	At US Highway 90	19.00	6,543	*	9,039	10,743	*	13,407

**Table 10: Summary of Discharges, (continued)**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Annual Chance Future	0.2% Annual Chance
Seals Creek	Below confluence with Unnamed Tributary	18.14	6,248	*	8,629	10,285	*	12,834
Seals Creek	Above confluence with Unnamed Tributary	15.74	5,584	*	7,624	9,053	*	11,240
Seals Creek	At State Highway 80	15.14	5,437	*	7,439	8,767	*	10,893
Seals Creek Tributary	At the confluence with Seals Creek	2.40	1,620	*	2,241	2,642	*	3,299
Seals Creek Tributary	At State Highway 80	2.25	1,519	*	2,101	2,477	*	3,092
Stream TB-1	Upstream of confluence with Town Branch	0.59	615	*	887	1,029	*	1,214
Tenney Creek	At lower limit of detailed study	14.89	1,130	*	1,665	2,149	*	2,752
Tenney Creek	Below confluence with Campbell Creek	13.95	862	*	1,269	1,666	*	2,132
Tenney Creek	Above confluence with Campbell Creek	8.29	476	*	699	920	*	1,176
Tenney Creek	Below SCS Dam Site No. 28	7.33	46	*	46	46	*	762
Town Branch	Upstream of confluence with Plum Creek	5.93	4,140	*	6,427	7,664	*	9,254

**Table 10: Summary of Discharges, (continued)**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Annual Chance Future	0.2% Annual Chance
Town Branch	Upstream of Missouri-Kansas-Texas Railroad and east of Sewage Disposal Plant	5.26	3,787	*	5,849	6,962	*	8,348
Town Branch	Downstream of US Route 183	4.36	3,165	*	4,922	5,855	*	6,998
Town Branch	Downstream of Pecos Street	3.61	2,577	*	4,044	4,863	*	5,983
Town Branch	Upstream of Pecos Street	3.02	2,109	*	3,336	4,021	*	4,942
Town Branch	Downstream of Stueve Lane	2.65	2,100	*	3,243	3,864	*	4,683
Town Branch	Downstream of Missouri-Kansas-Texas Railroad located 3,400 feet upstream of Stueve Lane	1.92	1,518	*	2,317	2,755	*	3,328
Town Branch	Upstream of Missouri-Kansas-Texas Railroad located 3,400 feet upstream of Stueve Lane	1.39	1,109	*	1,690	2,007	*	2,423

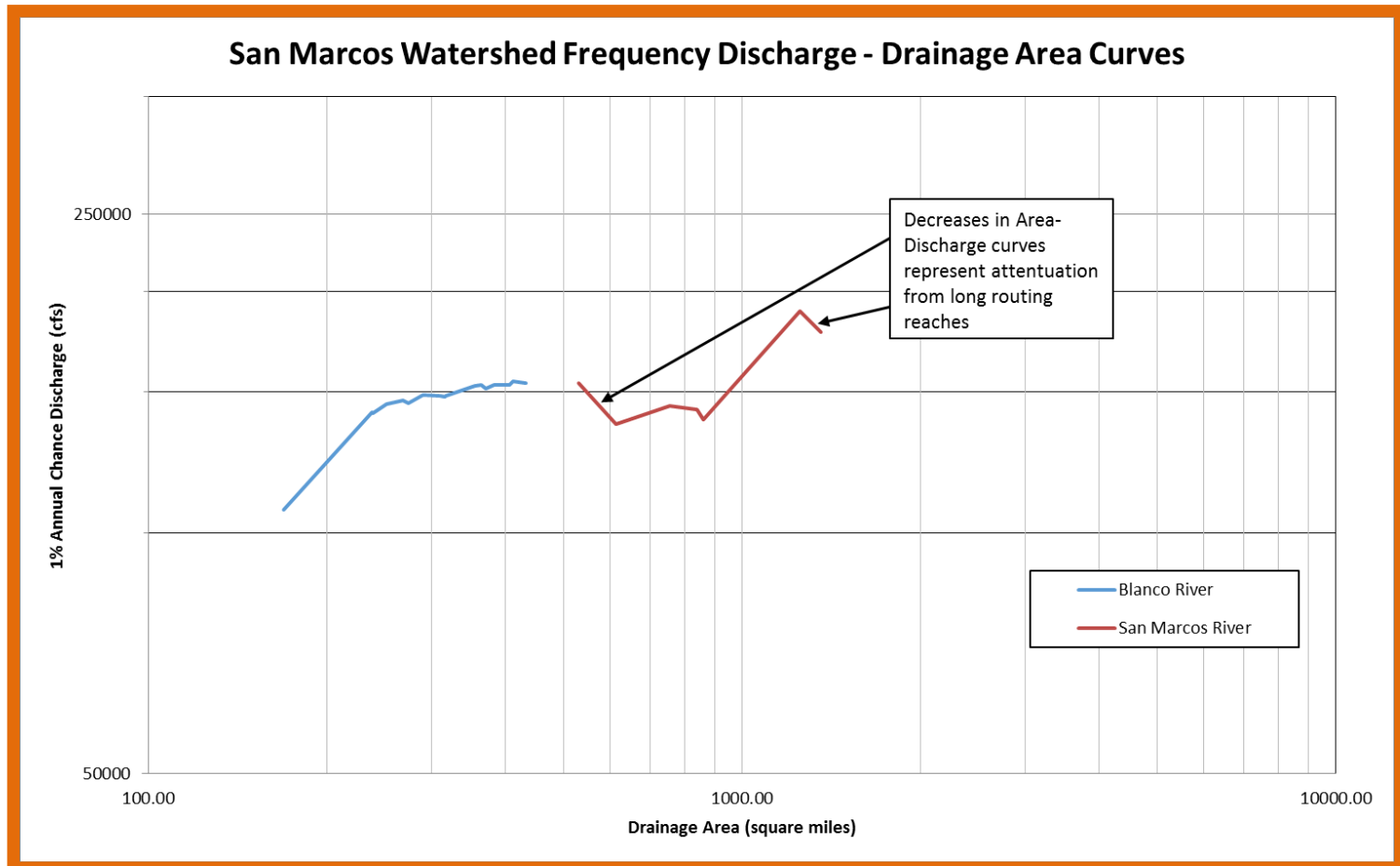
**Table 10: Summary of Discharges, (continued)**

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (cfs)					
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	1% Annual Chance Future	0.2% Annual Chance
West Fork Plum Creek	State Highway 20	7.26	3,900	*	5,448	6,209	*	7,782

<sup>1</sup> Flows derived from breakout of Blanco River

\*Not calculated for this Flood Risk Project

Figure 7: Frequency Discharge-Drainage Area Curves





**Table 11: Summary of Non-Coastal Stillwater Elevations**

Flooding Source	Location	Elevations (feet NAVD88)				
		10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Brushy Creek	At SCS Dam No. 14	531.3	*	537.1	538.8	541.8

\*Not calculated for this Flood Risk Project

**Table 12: Stream Gage Information used to Determine Discharges**

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Plum Creek	08172400	USGS	Plum Creek at Lockhart; TX	112	05/01/1959	*
Plum Creek	08173000	USGS	Plum Creek near Luling; TX	309	04/01/1930	*
San Marcos River	08170500	USGS	San Marcos Rv at San Marcos, TX	49	07/01/1915	*
San Marcos River	08172000	USGS	San Marcos River at Luling; TX	838	05/01/1939	*

\*Gage is currently active at time of FIS creation

## 5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed in Table 24, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

**Table 13: Summary of Hydrologic and Hydraulic Analyses**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Bear Gulch	Confluence with Sandy Fork	2.57 miles upstream of confluence with Sandy Fork	N/A	N/A	02/1980	A	
Bee Creek	Hays-Caldwell County Boundary	0.98 miles upstream of FM Road 86	N/A	N/A	02/1980	A	
Big Sandy Branch	Confluence with Sandy Fork	2.39 miles upstream of County Road 617	N/A	N/A	02/1980	A	
Big West Fork	State Highway 130	0.83 miles upstream of County Road 109	HEC-1	HEC-2	02/1980	AE w/ Floodway	
Big West Fork	Confluence with Little West Fork and West Fork Plum Creek	State Highway 130	N/A	N/A	02/1980	A	
Boggy Creek	Confluence with Clear Fork Plum Creek	0.89 miles upstream of County Road 230	N/A	N/A	02/1980	A	
Brushy Branch	Confluence with Clear Fork Plum Creek	0.61 miles upstream of County Road 209	N/A	N/A	02/1980	A	
Brushy Creek	Confluence with Plum Creek	Camino Real Highway	Regression Equations	HEC-2	02/18/1998	AE w/ Floodway	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Brushy Creek #2	Confluence with Hollow Pool	0.82 miles upstream of FM Road 1854	N/A	N/A	02/1980	A	
Buck Branch	Guadalupe- Caldwell County Boundary	0.85 miles upstream of County Road 1151	N/A	N/A	02/1980	A	
Bypass Creek	Confluence with San Marcos River	State Highway 21	HEC-HMS 3.5	HEC-RAS 4.1	8/31/2016	AE w/ Floodway	
Callihan Creek	Confluence with San Marcos River	1.24 miles upstream of County Road 111	N/A	N/A	02/1980	A	
Campbell Creek	Confluence with Tenney Creek	0.65 miles upstream of Sand Hill Road	HEC-1	HEC-2	02/1980	AE w/ Floodway	Flood retarding structures determine the upper limits of detailed study. Peak flows generated from the watershed upstream of the structure were routed through the structures using HEC-1. These flows were then compared to peak flows generated by the portions of the watersheds defined by the detailed study limits (downstream of the flood retarding structures). The greater of these values were then used in determining flood heights along the two creeks.
Campbell Creek	Limit of Detailed Study	1.2 miles upstream of Limit of Detailed Study	N/A	N/A	02/1980	A	
Cat Branch	Bastrop-Caldwell County Boundary	2.3 miles upstream of FM Road 20	N/A	N/A	02/1980	A	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Cedar Creek	Bastrop-Caldwell County Boundary	1.0 miles upstream of County Road 177	N/A	N/A	02/1980	A	
Chalk Hollow	Gonzales- Caldwell County Boundary	0.14 miles upstream of County Road 152	N/A	N/A	02/1980	A	
Clear Fork Plum Creek	Confluence with Plum Creek	Hays-Caldwell County Boundary	N/A	N/A	02/1980	A	
Copperas Creek	Confluence with Plum Creek	0.68 miles upstream of County Road 609	N/A	N/A	02/1980	A	
Copperas Creek	Gonzales- Caldwell County Boundary	0.36 miles upstream of FM Road 713	N/A	N/A	02/1980	A	
Cottonwood Creek	Confluence with Cry Creek	2.64 miles upstream of confluence with Dry Creek	N/A	N/A	02/1980	A	
Cowpen Creek	Confluence with Elm Creek	Hays-Caldwell County Boundary	N/A	N/A	02/1980	A	
Crooked Branch	Confluence with Callihan Creek	1.31 miles upstream of County Road 111	N/A	N/A	02/1980	A	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Daniels Creek	Confluence with Tenney Creek	0.88 miles upstream of FM Road 713	N/A	N/A	02/1980	A	
Devil Hollow	Confluence with Sandy Fork	1.57 miles upstream of FM Road 713	N/A	N/A	02/1980	A	
Dickerson Creek	Confluence with San Marcos River	1.9 miles upstream of County Road 107	N/A	N/A	02/1980	A	
Dry Branch	Confluence with Clear Fork Plum Creek	0.21 miles upstream of County Road 644	N/A	N/A	02/1980	A	
Dry Creek	Confluence with Plum Creek	2.71 miles upstream of County Road 1179	N/A	N/A	02/1980	A	
Dry Creek #2	Confluence with Plum Creek	0.61 miles upstream of County Road 158	N/A	N/A	02/1980	A	
Elm Creek	Confluence with Plum Creek	Hays-Caldwell County Boundary	N/A	N/A	02/1980	A	
Haggai Creek	Confluence with Walnut Creek	0.83 miles upstream of County Road 257	N/A	N/A	02/1980	A	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Haw Branch	Confluence with Dry Creek #2	0.45 miles upstream of County Road 160	N/A	N/A	02/1980	A	
Hemphill Creek	Confluence with Morrison Creek	Hays-Caldwell County Boundary	N/A	N/A	02/1980	A	
Hines Branch	Confluence with Plum Creek	4.05 miles upstream of County Road 141	N/A	N/A	02/1980	A	
Hollow Pool	Confluence with Brushy Creek #2	2.04 miles upstream of FM Road 672	N/A	N/A	02/1980	A	
House Log Branch	Confluence with Dry Creek #2	1.27 miles upstream of County Road 162	N/A	N/A	02/1980	A	
Jerry Creek	Confluence with Dry Creek	0.34 miles upstream of County Road 179	N/A	N/A	02/1980	A	
Linscome Creek	Confluence with Dry Creek #2	1.51 miles upstream of County Road 179	N/A	N/A	02/1980	A	
Little West Fork	Confluence with West Fork Plum Creek and Big West Fork	10 feet upstream of Long Road	HEC-1	HEC-2	02/1980	AE w/ Floodway	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Little West Fork	Limit of Detailed Study	0.68 miles upstream of Limit of Detailed Study	N/A	N/A	02/1980	A	
Lytton Creek	Bastrop-Caldwell County Boundary	0.89 miles upstream of County Road 172	N/A	N/A	02/1980	A	
Lytton Springs Creek	Bastrop-Caldwell County Boundary	1.49 miles upstream of County Road 174	N/A	N/A	02/1980	A	
Martindale Diversion	Confluence with San Marcos River	FM Road 1979	HEC-HMS 4.1	HEC-RAS 4.1	8/31/2016	AE w/ Floodway	
McNeil Creek	Confluence with Plum Creek	1.27 mile upstream of County Road 130	N/A	N/A	02/1980	A	
Mebane Creek	0.4 miles downstream of FM Road 20	60 feet upstream of Clear Fork Road	HEC-1	HEC-2	08/1989	AE w/ Floodway	
Mebane Creek	Confluence with Clear Fork Plum Creek	1.76 miles downstream of FM Road 20	N/A	N/A	02/1980	A	
Morrison Creek	Confluence with Hemphill Creek	1.8 miles upstream of County Road 238	N/A	N/A	02/1980	A	



**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Mule Creek	Gonzales- Caldwell County Boundary	0.85 miles upstream of Gonzales- Caldwell County Boundary	N/A	N/A	02/1980	A	
Pecan Branch	Confluence with Plum Creek	4.19 miles upstream of Confluence with Plum Creek	N/A	N/A	02/1980	A	
Pin Oak Creek	Confluence with West Fork Plum Creek	3.34 miles upstream of County Road 114	N/A	N/A	02/1980	A	
Plum Creek	1,400 feet downstream of the Hays- Caldwell County Boundary	Hays-Caldwell County Boundary	2004 State Regression Equations – Region 3	HEC-RAS 3.1	06/30/2007	AE w/ Floodway	
Plum Creek	1.05 miles upstream of Gonzales- Caldwell County Boundary	Hays-Caldwell County Boundary	N/A	N/A	02/1980	A	
Rabbit Branch	Confluence with Elm Creek	1.62 miles upstream of County Road 221	N/A	N/A	02/1980	A	
Salt Branch	Confluence with Plum Creek	0.32 miles upstream of FM Road 2984	N/A	N/A	02/1980	A	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
San Marcos River	Confluence with Plum Creek	800 feet upstream of FM Road 266	HEC-HMS 4.1	HEC-RAS 4.1	8/31/2016	AE w/ Floodway	
Sandy Creek	Gonzales-Caldwell County Boundary	0.98 miles upstream of Confluence with Devil Hollow	N/A	N/A	02/1980	A	
Scruggs Creek	Confluence with Sandy Fork	0.76 miles upstream of County Road 301	N/A	N/A	02/1980	A	
Seals Creek	US Highway 90	40 feet upstream of State Highway 80	HEC-1	HEC-2	02/1980	AE w/ Floodway	
Seals Creek	State Highway 80	FM Road 20	N/A	N/A	02/1980	A	
Seals Creek Tributary	Confluence with Seals Creek	25 feet upstream of State Highway 80	HEC-1	HEC-2	02/1980	AE w/ Floodway	
Seals Creek Tributary	25 feet upstream of State Highway 80	5,055 feet upstream of State Highway 80	N/A	N/A	02/1980	A	
Sixmile Creek	Confluence with Plum Creek	2.8 miles upstream of County Road 197	N/A	N/A	02/1980	A	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Spanish Oak Creek	Confluence with Dry Creek #2	1.1 miles upstream of County Road 159	N/A	N/A	02/1980	A	
Stream BPC-1	Confluence with Bypass Creek	Caldwell County boundary	HEC-HMS 3.5	HEC-RAS 4.1	8/31/2016	AE w/ Floodway	
Stream BPC-2	Confluence with Bypass Creek	Caldwell County boundary	HEC-HMS 3.5	HEC-RAS 4.1	8/31/2016	AE w/ Floodway	
Stream TB-1	Confluence with Town Branch	Divergence from Town Branch	HEC-1	HEC-2	08/1989	AE w/ Floodway	
Tenney Creek	1.5 miles downstream of FM 3158	0.7 miles upstream of FM Road 713	HEC-1	HEC-2	02/1980	AE w/ Floodway	Flood retarding structures determine the upper limits of detailed study. Peak flows generated from the watershed upstream of the structure were routed through the structures using HEC-1. These flows were then compared to peak flows generated by the portions of the watersheds defined by the detailed study limits (downstream of the flood retarding structures). The greater of these values were then used in determining flood heights along the two creeks.
Tenney Creek	Confluence with Plum Creek	1.5 miles downstream of FM 3158	N/A	N/A	02/1980	A	
Tenney Creek	0.7 miles upstream of FM Road 713	1.8 miles upstream of FM Road 713	N/A	N/A	02/1980	A	
Town Branch	500 feet downstream of Union Pacific Railroad	1.0 miles upstream of Pecos Street	HEC-1	HEC-2	08/1989	AE w/ Floodway	

**Table 13: Summary of Hydrologic and Hydraulic Analyses, (continued)**

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Walnut Creek	Caldwell County Boundary	2.8 miles upstream of Confluence with FM Road 1854	N/A	N/A	02/1980	A	
West Fork Plum Creek	Confluence with Plum Creek	FM Road 20	HEC-1	HEC-2	02/1980	AE w/ Floodway	
West Fork Plum Creek	FM Road 20	Confluence of Little West Fork and Big West Fork	N/A	N/A	02/1980	A	

**Table 14: Roughness Coefficients**

Flooding Source	Channel “n”	Overbank “n”
Big West Fork	0.020-0.055	0.050-0.060
Brushy Creek	0.035-0.050	0.070-0.080
Bypass Creek	0.035-0.060	0.055-0.070
Campbell Creek	0.025-0.080	0.040-0.055
Little West Fork	0.020-0.055	0.050
Martindale Diversion	0.030-0.080	0.035-0.095
Mebane Creek	0.045-0.070	0.050-0.075
Plum Creek	0.050-0.065	0.065-0.070
San Marcos River	0.045-0.070	0.060-0.120
Seals Creek	0.030-0.050	0.040-0.080
Seals Creek Tributary	0.035-0.060	0.040-0.080
Stream BPC-1	0.030-0.050	0.050-0.090
Stream BPC-2	0.045-0.060	0.050-0.090
Stream TB-1	0.040-0.060	0.050-0.070
Tenney Creek	0.303-0.070	0.040-0.070
Town Branch	0.030-0.065	0.040-0.085
West Fork Plum Creek	0.025-0.070	0.050-0.070

### **5.3 Coastal Analyses**

This section is not applicable to this Flood Risk Project.

**Table 15: Summary of Coastal Analyses**

**[Not Applicable to this Flood Risk Project]**

#### **5.3.1 Total Stillwater Elevations**

This section is not applicable to this Flood Risk Project.

**Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas**

**[Not Applicable to this Flood Risk Project]**

**Table 16: Tide Gage Analysis Specifics**  
**[Not Applicable to this Flood Risk Project]**

**5.3.2 Waves**

This section is not applicable to this Flood Risk Project.

**5.3.3 Coastal Erosion**

This section is not applicable to this Flood Risk Project.

**5.3.4 Wave Hazard Analyses**

This section is not applicable to this Flood Risk Project.

**Table 17: Coastal Transect Parameters**  
**[Not Applicable to this Flood Risk Project]**

**Figure 9: Transect Location Map**  
**[Not Applicable to this Flood Risk Project]**

**5.4 Alluvial Fan Analyses**

This section is not applicable to this Flood Risk Project.

**Table 18: Summary of Alluvial Fan Analyses**  
**[Not Applicable to this Flood Risk Project]**

**Table 19: Results of Alluvial Fan Analyses**  
**[Not Applicable to this Flood Risk Project]**

## SECTION 6.0 – MAPPING METHODS

### 6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov), or contact the National Geodetic Survey (NGS) at the following address:

NGS Information Services  
NOAA, N/NGS12  
National Geodetic Survey  
SSMC-3, #9202  
1315 East-West Highway  
Silver Spring, Maryland 20910-3282  
(301) 713-3242

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRMs for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their website at [www.ngs.noaa.gov](http://www.ngs.noaa.gov).

The countywide conversion factor of 0.23 feet was calculated for Caldwell County.

#### **Table 20: Countywide Vertical Datum Conversion**

**[Not Applicable to this Flood Risk Project]**

**Table 21: Stream-Based Vertical Datum Conversion**

**[Not Applicable to this Flood Risk Project]**

## 6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA's FIRM Database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA's *Guidelines and Standards for Flood Risk Analysis and Mapping*, [www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping](http://www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping).

Base map information shown on the FIRM was derived from the sources described in Table 22.

**Table 22: Base Map Sources**

Data Type	Data Provider	Data Date	Data Scale	Data Description
Political Boundaries	City of San Marcos	2016	N/A	Municipal boundaries
Political boundaries	Texas Department of Transportation (TxDOT)	2015	1:5,000	Municipal and county boundaries
Transportation Features	U.S. Department of Commerce	2015	N/A	Roads and railroads from Tiger/line shapefile

## 6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary has been shown. Small areas



within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

**Table 23: Summary of Topographic Elevation Data used in Mapping**

Community	Flooding Source	Source for Topographic Elevation Data					
		Description	Scale	Contour Interval	RMSE <sub>z</sub>	Accuracy <sub>z</sub>	Citation
Caldwell County and Incorporated Areas	All other streams	Topographic maps	1:24,000	10 ft	N/A	N/A	USGS 1964
Caldwell County Unincorporated Areas; Luling, City of; Martindale, City of; San Marcos, City of	San Marcos River, Martindale Diversion, Stream BC-1, Stream BC-2	LiDAR	N/A	N/A	15 cm	29.4 cm	TNRIS 2011
Caldwell County Unincorporated Areas; Luling, City of; Martindale, City of; San Marcos, City of	San Marcos River, Martindale Diversion, Stream BC-1, Stream BC-2	LiDAR	N/A	N/A	18.5 cm	36.3 cm	CAPCOG 2008
Caldwell County Unincorporated Areas	San Marcos River	LiDAR	N/A	N/A	12.5 cm	24.5 cm	FEMA 2011

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in areas with static base flood elevations.

**Table 24: Floodway Data**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,460	80	400	8.7	480.9	480.9	481.2	0.3
B	2,700	200	900	3.8	485.8	485.8	486.4	0.6
C	4,980	335	1,250	2.5	494.7	494.7	495.5	0.8

<sup>1</sup>Stream distance in feet above confluence with Little West Fork

TABLE 24

**FEDERAL EMERGENCY MANAGEMENT AGENCY**

**CALDWELL COUNTY, TEXAS**

**AND INCORPORATED AREAS**

**FLOODWAY DATA**

**FLOODING SOURCE: BIG WEST FORK**

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	21,300	982	3,960	2.4	538.8	535.7 <sup>2</sup>	535.7 <sup>2</sup>	0.0
B	23,280	600	2,982	3.2	538.8	538.5 <sup>2</sup>	538.5 <sup>2</sup>	0.0
C	24,620	1,168	6,142	1.6	541.1	541.1 <sup>2</sup>	541.2 <sup>2</sup>	0.1

<sup>1</sup>Stream distance in feet above confluence with Plum Creek.

<sup>2</sup>Elevation computed without consideration of backwater effects from SCS Dam No. 14.

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY  CALDWELL COUNTY, TEXAS  AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: BRUSHY CREEK

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	2,050	1,403	8,905	2.1	555.5	555.5	556.5	1.0
B	2,437	1,320	7,033	2.6	555.7	555.7	556.7	1.0
C	3,852	1,530	6,815	2.7	557.2	557.2	557.7	0.5
D	5,018	906	4,931	3.8	559.0	559.0	560.0	1.0
E	5,508	762	4,802	3.9	559.7	559.7	560.7	1.0
F	6,014	611	4,476	4.2	560.4	560.4	561.4	1.0
G	6,712	430	3,566	5.2	561.6	561.6	562.6	1.0
H	7,476	384	3,309	5.7	562.7	562.7	563.7	1.0
I	7,949	281	2,513	7.4	563.4	563.4	564.4	1.0
J	8,674	312	3,128	6.0	566.1	566.1	566.6	0.5
K	12,564	572/468 <sup>2</sup>	6,468	2.7	579.6	579.6	579.7	0.1
L	14,513	1,073	4,135	1.2	580.1	580.1	580.3	0.2
M	15,404	691	2,917	2.7	580.6	580.6	580.7	0.1
N	16,604	1,095	2,881	2.6	582.9	582.9	582.9	0.0

<sup>1</sup>Stream distance in feet above confluence with San Marcos River.

<sup>2</sup>Width/Width within Caldwell County

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY  CALDWELL COUNTY, TEXAS  AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: BYPASS CREEK

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	370	39	259	3.8	439.2	439.2	439.2	0.0
B	1,400	47	437	2.2	440.7	440.7	440.8	0.1
C	2,800	42	309	2.1	445.7	445.7	445.9	0.2
D	6,450	28	141	1.6	455.8	455.8	455.8	0.0
E	9,900	20	14	4.8	462.3	462.3	462.3	0.0

<sup>1</sup>Stream distance in feet above confluence with Tenney Creek

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY  CALDWELL COUNTY, TEXAS  AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: CAMPBELL CREEK

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	400	395 <sup>2</sup>	1,952	3.2	478.1	478.1	479.1	1.0
B	1,400	358	999	3.9	479.9	479.9	480.7	0.8
C	2,440	250	1,020	3.8	483.0	483.0	483.8	0.8

<sup>1</sup>Stream distance in feet above confluence with Big West Fork.

<sup>2</sup>Common floodway with Big West Fork.

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY  CALDWELL COUNTY, TEXAS  AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: LITTLE WEST FORK

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	5,627	2,883	22,773	3.2	497.5	497.5	498.2	0.7
B	9,797	1,492	14,016	4.3	501.2	501.2	501.9	0.7
C	21,429	1,291	6,628	8.7	512.9	512.9	513.6	0.7

<sup>1</sup>Stream distance in feet above convergence with San Marcos River

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: MARTINDALE DIVERSION</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	9,510	120	443	4.2	522.9	522.9	523.8	0.9
B	10,140	300	1,529	1.2	527.3	527.3	528.1	0.8
C	11,810	300	1,359	0.9	532.7	532.7	533.0	0.3
D	12,580	100	334	3.5	533.1	533.1	535.7	0.6

<sup>1</sup>Stream distance in feet above confluence with Clear Fork Plum Creek.

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY  CALDWELL COUNTY, TEXAS  AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: MEBANE CREEK



**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
N	145,539	4,152 / 192 <sup>2</sup>	51,606	1.6	344.7	344.7	345.2	0.5
O	151,877	2,284 / 2,186 <sup>2</sup>	27,387	3.0	345.7	345.7	346.1	0.4
P	156,972	2,522 / 104 <sup>2</sup>	31,637	2.6	347.6	347.6	347.9	0.3
Q	168,643	4,283 / 753 <sup>2</sup>	40,058	2.4	350.8	350.8	351.4	0.6
R	175,976	3,706 / 1,753 <sup>2</sup>	40,249	3.5	354.5	354.5	355.1	0.6
S	190,366	3,575 / 148 <sup>2</sup>	36,934	5.7	361.8	361.8	362.6	0.8
T	194,426	4,017 / 1,337 <sup>2</sup>	51,954	2.7	364.9	364.9	365.6	0.7
U	196,464	3,071 / 331 <sup>2</sup>	35,913	4.0	365.7	365.7	366.5	0.8
V	200,764	3,673 / 2,007 <sup>2</sup>	39,861	3.6	368.4	368.4	369.2	0.8
W	203,261	4,506 / 4,413 <sup>2</sup>	48,255	3.0	369.5	369.5	370.4	0.9
X	217,139	4,126 / 698 <sup>2</sup>	50,208	2.8	377.2	377.2	377.9	0.7
Y	223,385	3,234 / 1,302 <sup>2</sup>	45,036	3.2	381.8	381.8	382.1	0.3
Z	226,868	4,296 / 1,573 <sup>2</sup>	51,973	2.7	383.5	383.5	384.0	0.5
AA	232,057	5,140 / 1,141 <sup>2</sup>	43,193	3.3	385.1	385.1	385.6	0.5
AB	241,866	4,265	33,886	4.3	392.6	392.6	393.3	0.7
AC	244,962	5,293 / 5,113 <sup>2</sup>	40,913	4.6	399.8	399.8	400.3	0.5
AD	249,714	5,180 / 5,073 <sup>2</sup>	52,820	2.8	403.7	403.7	404.1	0.4

<sup>1</sup>Stream distance in feet above confluence with Guadalupe River

<sup>2</sup>Width within Caldwell County

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: SAN MARCOS RIVER</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AE	255,688	2,017 / 0 <sup>2</sup>	25,689	5.6	407.6	407.6	408.5	0.9
AF	264,915	3,201 / 332 <sup>2</sup>	29,945	4.8	414.1	414.1	415.0	0.9
AG	268,724	1,902 / 1,844 <sup>2</sup>	31,547	4.6	418.5	418.5	419.0	0.5
AH	277,233	1,851 / 1,168 <sup>2</sup>	22,383	6.1	424.4	424.4	424.9	0.5
AI	278,326	2,151 / 1,481 <sup>2</sup>	25,608	5.3	426.1	426.1	426.8	0.7
AJ	282,667	2,358 / 1,651 <sup>2</sup>	32,199	4.2	432.3	432.3	432.6	0.3
AK	287,283	2,512 / 2,060 <sup>2</sup>	30,373	4.5	435.9	435.9	436.2	0.3
AL	289,796	1,739 / 438 <sup>2</sup>	19,199	7.1	439.0	439.0	439.3	0.3
AM	297,868	4,267 / 153 <sup>2</sup>	40,827	3.3	446.0	446.0	446.8	0.8
AN	307,716	1,366 / 1,023 <sup>2</sup>	23,099	5.9	454.4	454.4	455.2	0.8
AO	316,807	2,319 / 2,136 <sup>2</sup>	25,229	5.4	468.3	468.3	469.0	0.7
AP	330,631	2,586 / 1,318 <sup>2</sup>	30,268	4.5	477.3	477.3	477.7	0.4
AQ	344,181	4,832 / 4,451 <sup>2</sup>	32,545	4.2	482.7	482.7	483.1	0.4
AR	349,090	1,878 / 229 <sup>2</sup>	22,812	6.0	488.2	488.2	489.0	0.8
AS	356,498	1,353 / 1,223 <sup>2</sup>	13,705	5.9	498.5	498.5	499.2	0.7
AT	361,669	1,174 / 452 <sup>2</sup>	17,281	5.4	504.9	504.9	505.7	0.8
AU	368,709	697 / 119 <sup>2</sup>	12,624	7.6	516.4	516.4	516.5	0.1

<sup>1</sup>Stream distance in feet above confluence with Guadalupe River

<sup>2</sup>Width within Caldwell County

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: SAN MARCOS RIVER</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
AV	371,789	1,895 / 1,659 <sup>2</sup>	31,726	4.8	521.3	521.3	521.8	0.5
AW	374,773	3,063 / 259 <sup>2</sup>	18,919	10.3	524.9	524.9	525.3	0.4
AX	380,955	4,856 / 321 <sup>2</sup>	24,688	6.2	535.6	535.6	536.0	0.4
AY	384,394	5,460 / 202 <sup>2</sup>	35,829	4.3	541.7	541.7	542.0	0.3
AZ	387,804	4,298 / 1,734 <sup>2</sup>	29,992	5.1	545.0	545.0	545.2	0.2
BA	392,770	3,302 / 342 <sup>2</sup>	25,012	6.1	552.0	552.0	552.3	0.3
BB	400,002	2,157 / 1657 <sup>2</sup>	22,880	6.7	563.8	563.8	564.3	0.5

<sup>1</sup>Stream distance in feet above confluence with Guadalupe River

<sup>2</sup>Width within Caldwell County

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: SAN MARCOS RIVER</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	680	500	2,975	3.6	370.2	366.6 <sup>2</sup>	367.0 <sup>2</sup>	0.4
B	3,360	505	3,612	2.9	370.2	369.9 <sup>2</sup>	370.8 <sup>2</sup>	0.9
C	6,100	1,232	5,862	1.8	371.5	371.5	372.4	0.9
D	7,645	404	2,651	3.3	374.0	374.0	374.9	0.9
E	9,230	550	3,515	2.5	375.2	375.2	376.2	1.0

<sup>1</sup>Stream distance in feet above approximately 27 feet downstream of U.S. Highway 90

<sup>2</sup>Elevation computed without consideration of backwater effects from San Marcos River

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: SEALS CREEK</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,360	200	840	3.1	371.5	371.5	372.5	1.0
B	1,760	100	362	7.1	374.2	374.2	374.7	0.5
C	2,350	100	443	5.6	375.2	375.2	376.2	1.0

<sup>1</sup>Stream distance in feet above confluence with Seals Creek.

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: SEALS CREEK TRIBUTARY</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	0	144	661	3.3	426.6	426.6	427.6	1.0
B	4,800	113	534	3.1	437.9	437.9	438.1	0.2
C	8,330	150	454	1.5	444.9	444.9	445.1	0.2
D	10,060	40	170	1.6	445.7	445.7	446.4	0.7
E	13,500	38	111	0.4	447.4	447.4	447.6	0.2

<sup>1</sup>Stream distance in feet above Limit of Detailed Study (7,900 feet downstream of FM Road 3158).

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b>  <b>CALDWELL COUNTY, TEXAS</b>  <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>	
		<b>FLOODING SOURCE: TENNEY CREEK</b>	

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	5,880	201	1,427	5.4	450.7	450.7	451.3	0.6
B	8,250	116	981	7.1	467.6	467.6	468.5	0.9
C	10,180	110	998	7.0	481.9	481.9	482.5	0.6
D	11,650	140	990	5.9	488.7	488.7	489.7	1.0
E	13,100	160	1,867	3.1	502.3	502.3	503.2	0.9
F	15,020	160	981	5.0	514.7	514.7	515.7	1.0
G	16,025	140	814	6.0	520.3	520.3	521.3	1.0
H	17,930	240	1,198	3.4	531.6	531.6	532.2	0.6
I	19,570	225	1,051	3.7	535.0	535.0	536.0	1.0

<sup>1</sup>Stream distance in feet above confluence with Plum Creek.

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: TOWN BRANCH</b>

**Table 24: Floodway Data, (continued)**

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE <sup>1</sup>	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	30	300	2,204	2.8	474.9	474.9	474.9	0.0
B	1,800	300	1,673	3.7	477.1	477.1	478.1	1.0

<sup>1</sup>Stream distance in feet above FM Road 20.

TABLE 24	<b>FEDERAL EMERGENCY MANAGEMENT AGENCY</b> <b>CALDWELL COUNTY, TEXAS</b> <b>AND INCORPORATED AREAS</b>	<b>FLOODWAY DATA</b>
		<b>FLOODING SOURCE: WEST FORK PLUM CREEK</b>



**Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams**

**[Not Applicable to this Flood Risk Project]**

#### **6.4 Coastal Flood Hazard Mapping**

This section is not applicable to this Flood Risk Project.

**Table 26: Summary of Coastal Transect Mapping Considerations**

**[Not Applicable to this Flood Risk Project]**

#### **6.5 FIRM Revisions**

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 31, “Map Repositories”).

##### **6.5.1 Letters of Map Amendment**

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA.

To obtain an application for a LOMA, visit [www.fema.gov/floodplain-management/letter-map-amendment-loma](http://www.fema.gov/floodplain-management/letter-map-amendment-loma) and download the form “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill”. Visit the “Flood Map-Related Fees” section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at [www.fema.gov/online-tutorials](http://www.fema.gov/online-tutorials).

For more information about how to apply for a LOMA, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

### **6.5.2 Letters of Map Revision Based on Fill**

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA's determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting [www.fema.gov/floodplain-management/letter-map-amendment-loma](http://www.fema.gov/floodplain-management/letter-map-amendment-loma) for the "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill" or by calling the FEMA Map Information eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the "Flood Map-Related Fees" section.

A tutorial for LOMR-F is available at [www.fema.gov/online-tutorials](http://www.fema.gov/online-tutorials).

### **6.5.3 Letters of Map Revision**

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit [www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions](http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions) and download the form "MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision". Visit the "Flood Map-Related Fees" section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Caldwell County FIRM are listed in Table 27. Please note that this table only includes LOMCs that have been issued on the FIRM panels updated by this map revision. For all other areas within this county, users should be aware that revisions to the FIS Report made by prior LOMRs may not be reflected herein and users will need to continue to use the previously issued LOMRs to obtain the most current data.

**Table 27: Incorporated Letters of Map Change**

**[Not Applicable to this Flood Risk Project]**

#### 6.5.4 Physical Map Revisions

A Physical Map Revisions (PMR) is an official republication of a community's NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community's chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit [www.fema.gov](http://www.fema.gov) and visit the "Flood Map Revision Processes" section.

#### 6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit [www.fema.gov](http://www.fema.gov) to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

#### 6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Caldwell County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBMs) and/or Flood Boundary and Floodway Maps (FBFMs) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 28, "Community Map History." A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.
- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or "pending" (for Preliminary FIS

Reports) is shown. If the community is listed in Table 28 but not identified on the map, the community is treated as if it were unmapped.

- *Initial FHBM Effective Date* is the effective date of the first FHBM. This date may be the same date as the Initial NFIP Map Date.
- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.
- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community.
- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as PMRs of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Caldwell County FIRMs in countywide format was 06/19/2012.

**Table 28: Community Map History**

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Caldwell County, Unincorporated Areas	05/27/1977	05/27/1977	N/A	3/15/1982	TBD 06/19/2012 07/21/1999 03/18/1986
Lockhart, City of	06/28/1974	06/28/1974	11/12/1976	11/05/1980	06/19/2012 01/17/1991
Luling, City of	05/24/1974	05/24/1974	5/7/1976	01/16/1979	TBD 06/19/2012 12/08/1998
Martindale, City of	05/27/1977	05/27/1977	N/A	03/15/1982	TBD 06/19/2012 12/08/1998 03/18/1986
Mustang Ridge, City of <sup>1</sup>	03/07/1978	03/07/1978	N/A	04/01/1982	01/06/2016 06/19/2012 09/26/2008 07/21/1999 06/16/1993

**Table 28: Community Map History, (continued)**

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Niederwald, City of <sup>2</sup>	03/21/1978	03/21/1978	N/A	06/16/1993	06/19/2012 02/18/1998
San Marcos, City of	08/28/1971	N/A	N/A	08/28/1971	<b>TBD</b> 06/19/2012 09/02/2005 02/18/1998 09/05/1990 09/01/1983 11/19/1980 11/05/1976 07/01/1974
Uhland, City of <sup>2</sup>	03/21/1978	03/21/1978	N/A	06/16/1993	06/19/2012 02/18/1998

<sup>1</sup>This community did not have its own FIRM prior to the countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Travis County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the Travis County FIRM

<sup>2</sup>This community did not have its own FIRM prior to the countywide FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Hays County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the Hays County FIRM.

## SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

### 7.1 Contracted Studies

Table 29 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

**Table 29: Summary of Contracted Studies Included in this FIS Report**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Bear Gulch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Bee Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Big Sandy Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas

**Table 29: Summary of Contracted Studies Included in this FIS Report, (continued)**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Big West Fork (Zone AE)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Big West Fork (Zone A)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Boggy Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Lockhart, City of
Brushy Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Brushy Creek <sup>1</sup>	02/18/1998	USACE	EMW-94-E-4317	06/1995	Caldwell County, Unincorporated Areas
Brushy Creek #2	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Buck Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Bypass Creek	TBD	Compass PTS JV	HSFE06-15-J-0002	8/31/2016	Caldwell County, Unincorporated Areas; San Marcos, City of
Callihan Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Campbell Creek (Zone AE)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Campbell Creek (Zone A)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Cat Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Cedar Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Mustang Ridge, City of

**Table 29: Summary of Contracted Studies Included in this FIS Report, (continued)**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Chalk Hollow	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Clear Fork Plum Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Lockhart, City of
Copperas Creek (Zone AE)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Copperas Creek (Zone A)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Cottonwood Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Cowpen Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Mustang Ridge, City of; Niederwald, City of
Crooked Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Daniels Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Devil Hollow	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Dickerson Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Dry Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Dry Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Dry Creek #2	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas

**Table 29: Summary of Contracted Studies Included in this FIS Report, (continued)**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Elm Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Niederwald, City of
Haggai Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Haw Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Hemphill Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Martindale, City of
Hines Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Hollow Pool	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
House Log Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Jerry Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Linscome Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Little West Fork (Zone AE)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Little West Fork (Zone AE)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Lytton Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Lytton Springs Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas



**Table 29: Summary of Contracted Studies Included in this FIS Report, (continued)**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Martindale Diversion	TBD	Compass PTS JV	HSFE06-15-J-0002	8/31/2016	Caldwell County, Unincorporated Areas; Martindale, City of
McNeil Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Mebane Creek	01/17/1991	USACE	N/A	08/1989	Caldwell County, Unincorporated Areas; Lockhart, City of
Mebane Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Lockhart, City of
Morrison Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Martindale, City of
Mule Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Pecan Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Pin Oak Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Plum Creek <sup>1</sup>	02/18/1998	USACE	EMW-94-E-4317	06/1995	Uhland, Township of
Plum Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Lockhart, City of ; Luling, City of; Uhland, Township of
Rabbit Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Salt Branch	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Luling, City of

**Table 29: Summary of Contracted Studies Included in this FIS Report, (continued)**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
San Marcos River	TBD	Compass PTS JV	HSFE06-15-J-0002	8/31/2016	Caldwell County, Unincorporated Areas; Luling, City of; Martindale, City of
Sandy Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Scruggs Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Seals Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas; Luling, City of
Seals Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Seals Creek Tributary	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Seals Creek Tributary	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Sixmile Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Spanish Oak Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Stream BPC-1	TBD	Compass PTS JV	HSFE06-15-J-0002	8/31/2016	San Marcos, City of
Stream BPC-2	TBD	Compass PTS JV	HSFE06-15-J-0002	8/31/2016	San Marcos, City of
Stream TB-1	01/17/1991	USACE	N/A	08/1989	Lockhart, City of
Tenney Creek (Zone AE)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Tenney Creek (Zone A)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
Tenney Creek (Zone A)	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas

**Table 29: Summary of Contracted Studies Included in this FIS Report, (continued)**

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Town Branch	01/17/1991	USACE	N/A	08/1989	Caldwell County, Unincorporated Areas; Lockhart, City of
Walnut Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
West Fork Plum Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas
West Fork Plum Creek	07/21/1999	URS	H-4643	02/1980	Caldwell County, Unincorporated Areas

<sup>1</sup>Data from Hays County, Texas, Flood Insurance Study

## 7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and previous Flood Risk Projects are shown in Table 30. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

**Table 30: Community Meetings**

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Caldwell County, Unincorporated Areas	TBD	09/21/2016	Other	Hays County, Caldwell County, Cities of Luling, San Marcos, and Wimberley, Compass JV, FEMA, GBRA, TWDB, USGS, and USACE
		09/22/2016	Flood Risk Review	Hays County, Caldwell County, City of San Marcos, TWDB, TDPS, GBRA, FEMA, and Compass JV
		10/19/2016	Flood Risk Review	Hays County, Caldwell, Guadalupe County, Cities of Martindale, Woodcreek, San Marcos, Luling, Wimberley, FEMA, TWDB, Compass JV
Lockhart, City of	06/19/2012	05/12/2008	Initial CCO	FEMA; Caldwell County; Luling, City of; Martindale, City of; Umland, City of; Halff Associates, Inc; Guadalupe Blanco River Authority; Plum Creek Conservation District
		05/19/2009	Final CCO	FEMA; Caldwell County
Luling, City of	TBD	09/21/2016	Other	Hays County, Caldwell County, Cities of Luling, San Marcos, and Wimberley, Compass JV, FEMA, GBRA, TWDB, USGS, and USACE
		10/19/2016	Flood Risk Review	Hays County, Caldwell, Guadalupe County, Cities of Martindale, Woodcreek, San Marcos, Luling, Wimberley, FEMA, TWDB, Compass JV
Martindale, City of	TBD	10/19/2016	Flood Risk Review	Hays County, Caldwell, Guadalupe County, Cities of Martindale, Woodcreek, San Marcos, Luling, Wimberley, FEMA, TWDB, Compass JV
Mustang Ridge, City of	06/19/2012	05/12/2008	Initial CCO	FEMA; Caldwell County; Luling, City of; Martindale, City of; Umland, City of; Halff Associates, Inc; Guadalupe Blanco River Authority; Plum Creek Conservation District
		05/19/2009	Final CCO	FEMA; Caldwell County

**Table 30: Community Meetings, (continued)**

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Niederwald, City of	06/19/2012	05/12/2008	Initial CCO	FEMA; Caldwell County; Luling, City of; Martindale, City of; Uhland, City of; Halff Associates, Inc; Guadalupe Blanco River Authority; Plum Creek Conservation District
		05/19/2009	Final CCO	FEMA; Caldwell County
San Marcos, City of	TBD	09/21/2016	Other	Hays County, Caldwell County, Cities of Luling, San Marcos, and Wimberley, Compass JV, FEMA, GBRA, TWDB, USGS, and USACE
		09/22/2016	Flood Risk Review	Hays County, Caldwell County, City of San Marcos, TWDB, TDPS, GBRA, FEMA, and Compass JV
		10/19/2016	Flood Risk Review	Hays County, Caldwell, Guadalupe County, Cities of Martindale, Woodcreek, San Marcos, Luling, Wimberley, FEMA, TWDB, Compass JV
Uhland, City of	06/19/2012	05/12/2008	Initial CCO	FEMA; Caldwell County; Luling, City of; Martindale, City of; Uhland, City of; Halff Associates, Inc; Guadalupe Blanco River Authority; Plum Creek Conservation District
		05/19/2009	Final CCO	FEMA; Caldwell County

## SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see [www.fema.gov](http://www.fema.gov).

The additional data that was used for this project includes the FIS Report and FIRM that were previously prepared for Caldwell County (FEMA 2012).

Table 31 is a list of the locations where FIRMs for Caldwell County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

**Table 31: Map Repositories**

Community	Address	City	State	Zip Code
Caldwell County, Unincorporated Areas	County Courthouse 110 South Main Street	Lockhart	TX	78644
Lockhart, City of	Planning Department 308 West San Antonio Street	Lockhart	TX	78644
Luling, City of	Mapping Department 509 East Crockett Street	Luling	TX	78648
Martindale, City of	City Hall 409 Main Street	Martindale	TX	78655
Mustang Ridge, City of	City Hall 12800 Highway 183 South	Buda	TX	78610
Niederwald, City of	City Hall 8807 Niederwald Strasse	Niederwald	TX	78640
San Marcos, City of	City Hall 630 East Hopkins Street	San Marcos	TX	78666
Uhland, City of	City Hall 15 North Old Spanish Trail	Uhland	TX	78640

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM Databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 32.

Table 32 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the State NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of State and local GIS data in their state.

**Table 32: Additional Information**

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	<a href="http://www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library">www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library</a>
NFIP website	<a href="http://www.fema.gov/national-flood-insurance-program">www.fema.gov/national-flood-insurance-program</a>
NFHL Dataset	<a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA Region VI	Jennifer Knecht FEMA Region Representative FEMA Region VI 800 North Loop 288 Denton, TX 76209 (940) 898-5553 <a href="mailto:Jennifer.Knecht@fema.dhs.gov">Jennifer.Knecht@fema.dhs.gov</a>
Other Federal Agencies	
USGS website	<a href="http://www.usgs.gov">www.usgs.gov</a>
Hydraulic Engineering Center website	<a href="http://www.hec.usace.army.mil">www.hec.usace.army.mil</a>
State Agencies and Organizations	
State NFIP Coordinator	Michael Segner, CFM Texas Water Development Board 1700 North Congress Avenue P.O. Box 13231 Austin, TX 78711-3231 (512) 463-3509 x111 <a href="mailto:michael.segner@twdb.texas.gov">michael.segner@twdb.texas.gov</a>
State GIS Coordinator	Mike Ouimet State GIS Coordinator 300 West 15th Street P.O. Box 13564 Austin, TX 78711-3564 (512) 305-9076 Fax: (512) 475-4759 <a href="mailto:mike.ouimet@dir.state.tx.us">mike.ouimet@dir.state.tx.us</a>

## **SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES**

Table 33 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.



**Table 33: Bibliography and References**

Citation in this FIS	Publisher/Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/Date of Issuance	Link
FEMA 1978	Federal Emergency Management Agency	<i>Flood Insurance Study, Hays County and Incorporated Areas</i>		Washington, D.C.	September 1978	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA 1991	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Lockhart, Caldwell County, Texas</i>		Washington, D.C.	01/17/1991	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA 1998	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Luling, Caldwell County, Texas</i>		Washington, D.C.	12/08/1998	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA 1998	Federal Emergency Management Agency	<i>Flood Insurance Study, City of Martindale, Caldwell County, Texas</i>		Washington, D.C.	12/08/1998	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA 1999	Federal Emergency Management Agency	<i>Flood Insurance Study, Unincorporated Areas of Caldwell County, Texas</i>		Washington, D.C.	07/21/1999	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA 2005	Federal Emergency Management Agency	<i>Flood Insurance Rate Map, Hays County, Texas and Incorporated Areas</i>		Washington, D.C.	09/02/2005	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>
FEMA 2012	Federal Emergency Management Agency	<i>Flood Insurance Rate Map, Caldwell County, Texas and Incorporated Areas</i>		Washington, D.C.	06/19/2012	FEMA Flood Map Service Center <a href="http://msc.fema.gov">msc.fema.gov</a>

**Table 33: Bibliography and References, continued**

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FIA 1986	U.S. Department of Housing and Urban Development	<i>Federal Insurance Administration, Flood Insurance Study</i>		Washington, D.C.	03/18/1986	
Interagency Advisory Committee 1981	Interagency Advisory Committee on Water Data, Hydrology Subcommittee	<i>Guidelines for Determining Flood Flow Frequency, Bulletin No. 17B</i>		Washington, D.C.	September 1981	
NOAA 1977	National Oceanic and Atmospheric Administration, National Weather Service	<i>Five to 60-Minute Precipitation Frequency for the Eastern and Central United States, Technical Memorandum NWS Hydro-35</i>		Washington, D.C.	June 1977	<a href="http://nws.noaa.gov/">nws.noaa.gov/</a>
NOAA 1994	National Oceanic and Atmospheric Administration	<i>Precipitation Return Frequencies for Hays County, Texas</i>		Washington, D.C.	1994	<a href="http://noaa.gov">noaa.gov</a>
USACE 1957	U.S. Department of the Army, Office of the Chief of Engineers	<i>Standard Project Flood Determinations</i>		Davis, CA	March 26, 1957	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1970	U.S. Department of the Army, Corp of Engineers	<i>Synthetic Unit Hydrograph Relationships, Trinity River Tributaries, Fort Worth-Dallas Urban Area</i>	Thomas Nelson	Davis, CA	September 1970	<a href="http://www.usace.army.mil">www.usace.army.mil</a>

**Table 33: Bibliography and References, continued**

Citation in this FIS	Publisher/Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/Date of Issuance	Link
USACE 1973	U.S. Department of the Army, Corp of Engineers	<i>Computer Program 723-X6-L2010, HEC-1 Flood Hydrograph Package</i>		Davis, CA	January 1973	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1977	U.S. Department of the Army, Corp of Engineers	<i>Effects of urbanization on Various Frequency Peak Discharges</i>	Paul Rodman	Davis, CA	October 1977	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1982	U.S. Department of the Army, Corp of Engineers	<i>Computer Program NUDALLAS</i>		Fort Worth, TX	September 1982	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1986	U.S. Department of the Army, Corp of Engineers	<i>NUDALLAS Documentation and Supporting Appendices</i>		Davis, CA	September 1986	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1991	U.S. Department of the Army, Corp of Engineers	<i>HEC-2 Water Surface Profiles, Generalized Computer Program</i>		Davis, CA	September 1991	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1992	U.S. Department of the Army, Corp of Engineers	<i>HEC-FFA Flood Frequency Analysis Computer Program</i>		Davis, CA	May 1992	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 1997	U.S. Department of the Army, Corp of Engineers	<i>Uncertainty Estimates for Nonanalytic Frequency Curves, ETL 1110-2-537</i>		Davis, CA	October 1997	<a href="http://www.usace.army.mil">www.usace.army.mil</a>

**Table 33: Bibliography and References, continued**

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USACE 2010	U.S. Department of the Army, Corp of Engineers	<i>Hydrologic Engineering Center, HEC-RAS River Analysis System v4.1</i>		Davis, CA	January 2010	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 2010	U.S. Department of the Army, Corp of Engineers	<i>HEC-HMS Flood Hydrograph Package v3.5</i>		Davis, CA	August 2010	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 2015	U.S. Department of the Army, Corp of Engineers	<i>Hydrologic Engineering Center, HEC-HMS Flood Hydrograph Package v4.1</i>		Davis, CA	July 2015	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 2015	U.S. Department of the Army, Corp of Engineers	<i>Lower Guadalupe Basin Guadalupe-Blanco River Authority Interim Feasibility Study – Phase 2, Technical Report Notebook (TRN) Engineering Analysis – Hydrology and Hydraulics</i>		Davis, CA	May 2015	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USACE 2016	U.S. Department of the Army, Corp of Engineers	<i>Interagency Flood Risk Management (InFRM) Hydrology Report for the San Marcos River Basin</i>		Davis, CA	Septemeber 2016	<a href="http://www.usace.army.mil">www.usace.army.mil</a>
USDA 1971	United States Department of Agriculture, Soil Conservation Service	<i>SCS National Engineering Handbook</i>		Washington, D.C.	January 1971	<a href="http://www.usda.gov/">http://www.usda.gov/</a>

**Table 33: Bibliography and References, continued**

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USDA 1973	United States Department of Agriculture, Soil Conservation Service	<i>Work Plan for Watershed Protection and Flood Prevention, Lower Plum Creek Watershed, Hays and Caldwell Counties, Texas</i>		Washington, D.C.	August 1960 & February 1973	
USDA 1978	United States Department of Agriculture, Soil Conservation Service	<i>Soil Survey of Caldwell County, Texas</i>		Washington, D.C.	July 1978	
USDOC 1964	U.S. Department of Commerce, Weather Bureau	<i>Technical Paper No. 49, 2 to 10-Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States</i>		Washington, D.C.	1964	<a href="https://www.noaa.gov/">nws.noaa.gov/</a>
USDOI 1994	U.S. Department of the Interior, Geologic Survey	<i>Multiple-Regression Equations to Estimate Peak Streamflow Frequency for Streams in Hays County, Texas</i>		Washington, D.C.	1994	<a href="https://www.doi.gov/">https://www.doi.gov/</a>
USGS 1981	U.S. Department of Interior, Geological Survey	<i>Guidelines for Determining Flood Flow Frequency, Bulletin 17B of the Hydrology Subcommittee</i>		Washington, D.C.	September 1981	
USGS 2004	U.S. Department of Interior, Geological Survey	<i>Atlas of Depth-Duration Frequency of Precipitation Annual Maxima for Texas SIR 2004-5041</i>	William Asquith, Meghan Roussel	Washington, D.C.	2004	

**Table 33: Bibliography and References, continued**

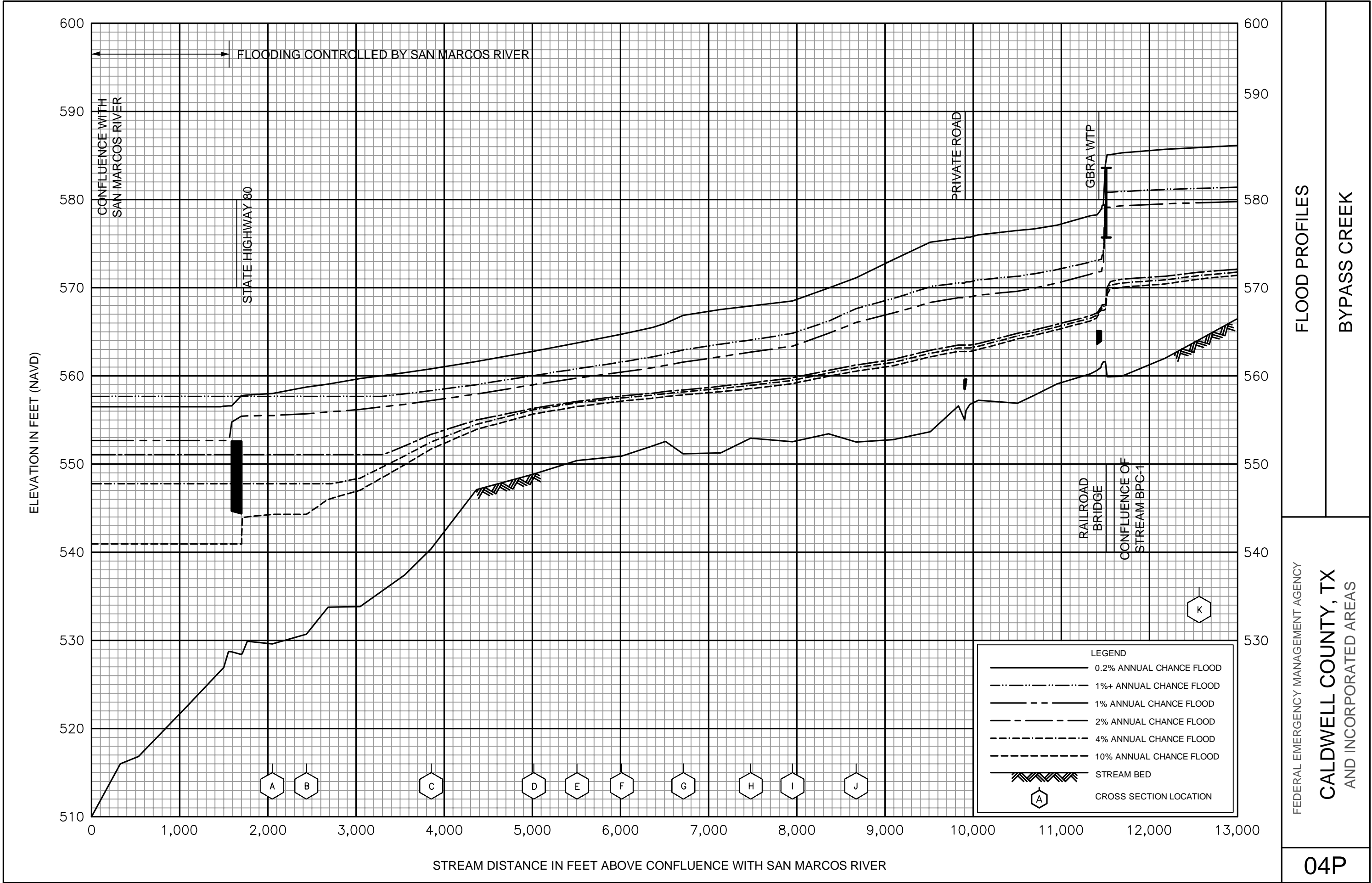
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USGS 1964	U.S. Department of Interior, Geological Survey	<i>7.5 Minute Topographic Quadrangles; San Marcos North (1964), San Marcos South (1964), Martindale (1964), Kingsbury (1964), Lockhart North (1964), Lockhart South (1964), Luling (1964), McMahan (1964), Hardwood (1964) and Delhi (1964)</i>		Washington, D.C.	1964	<a href="http://topomaps.usgs.gov">topomaps.usgs.gov</a>











FLOOD PROFILES

BYPASS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

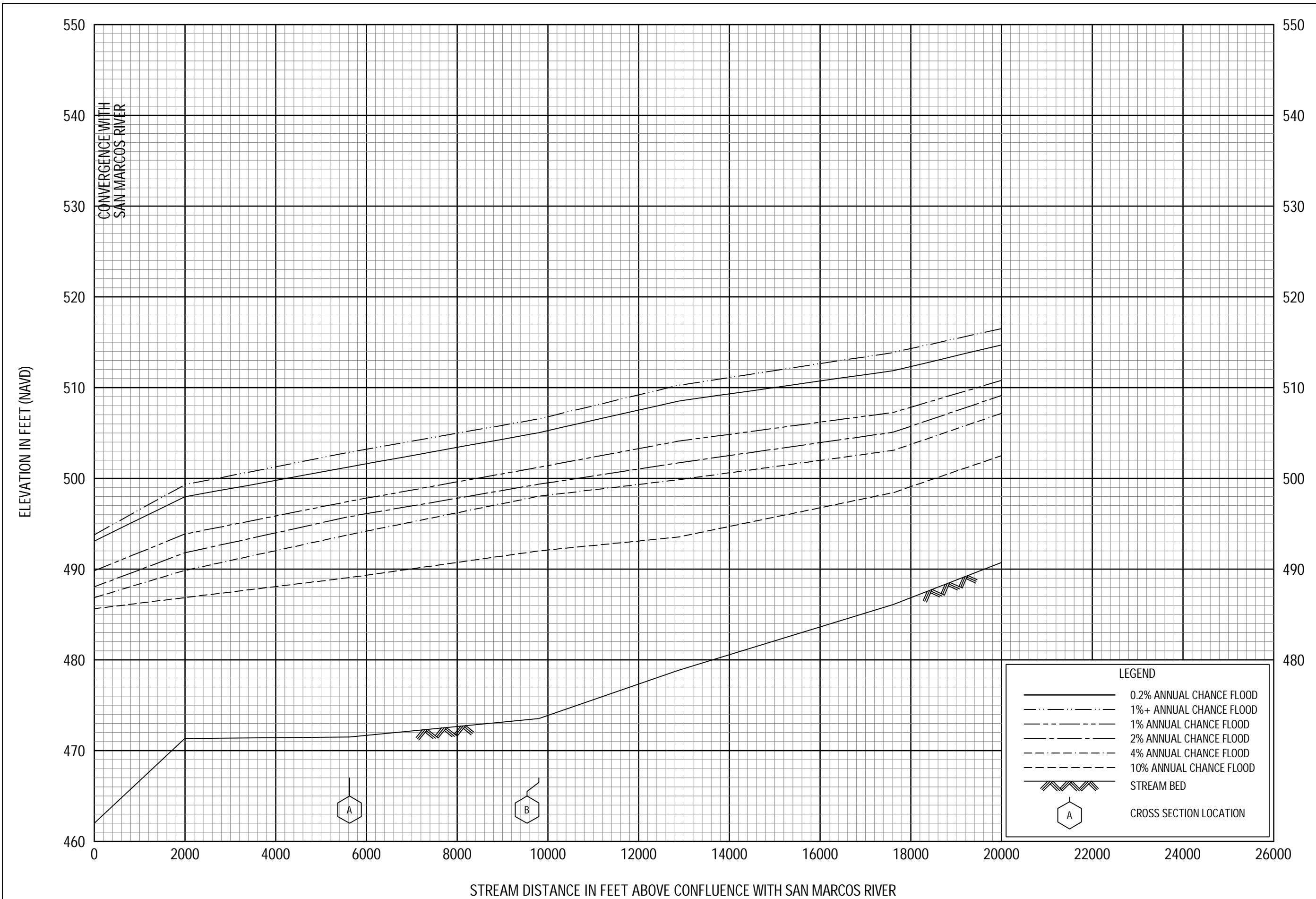
CALDWELL COUNTY, TX  
AND INCORPORATED AREAS

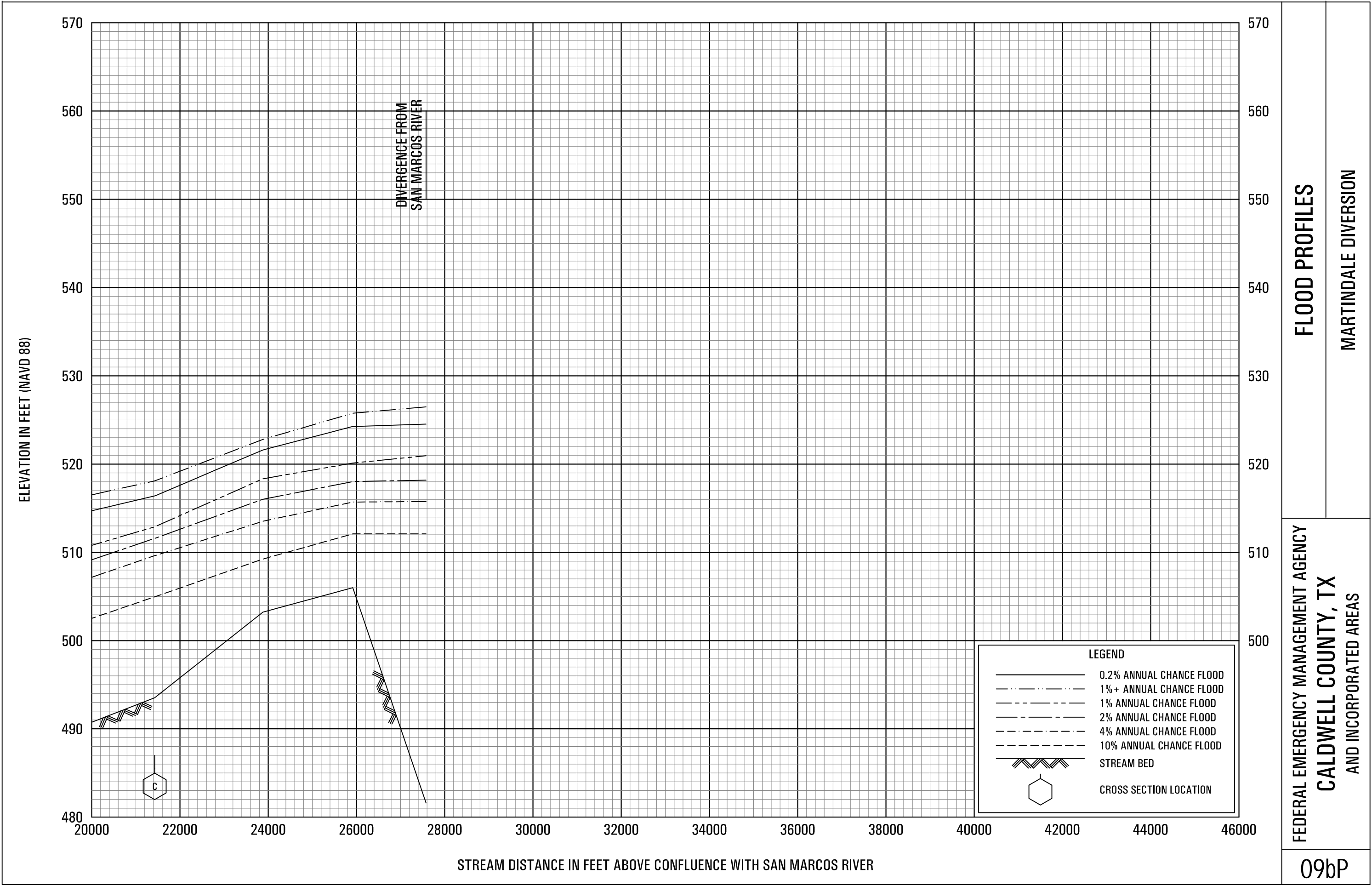










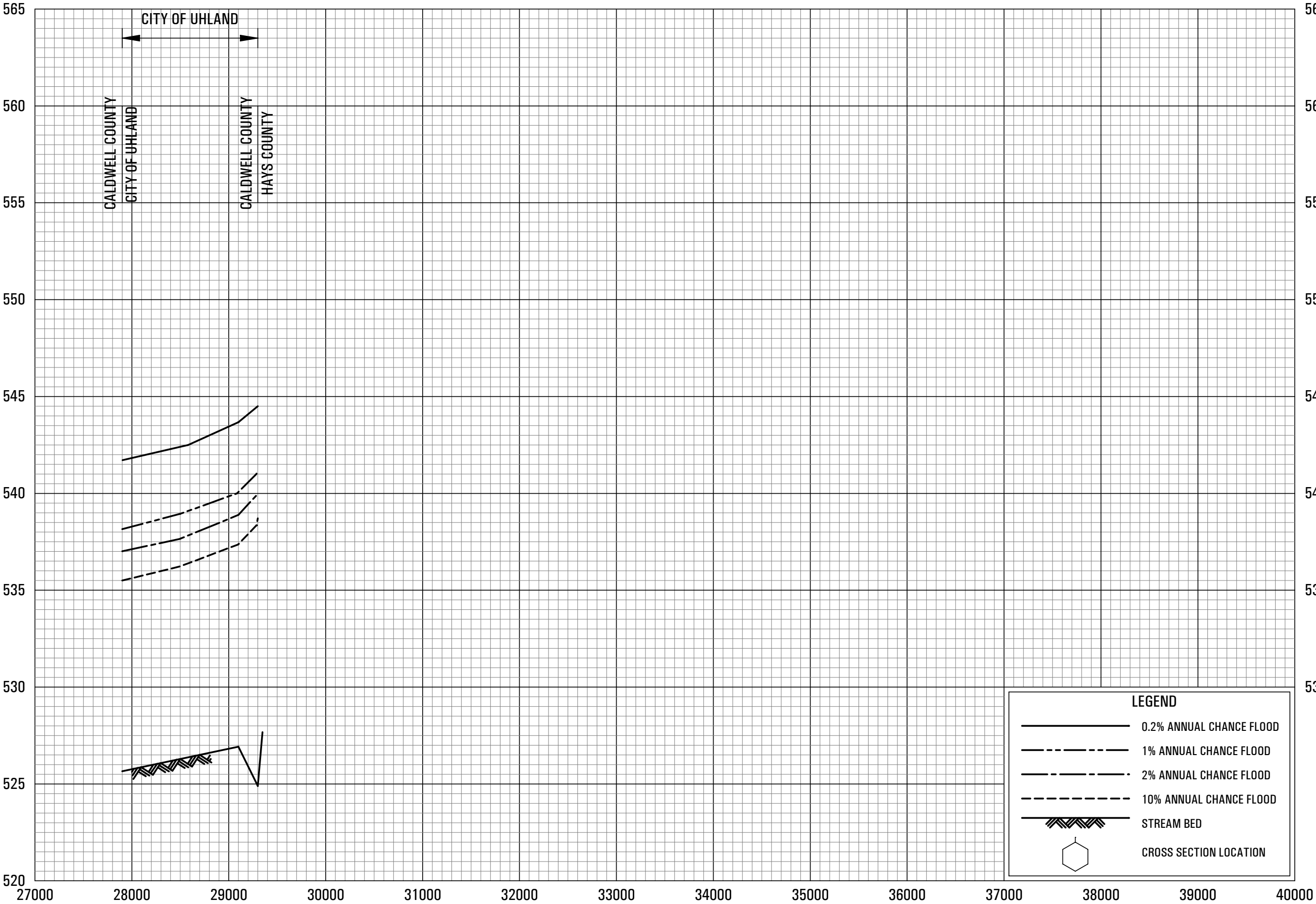








ELEVATION IN FEET (NAVD 88)



STREAM DISTANCE IN FEET ABOVE CONFLUENCE OF BRUSHY CREEK

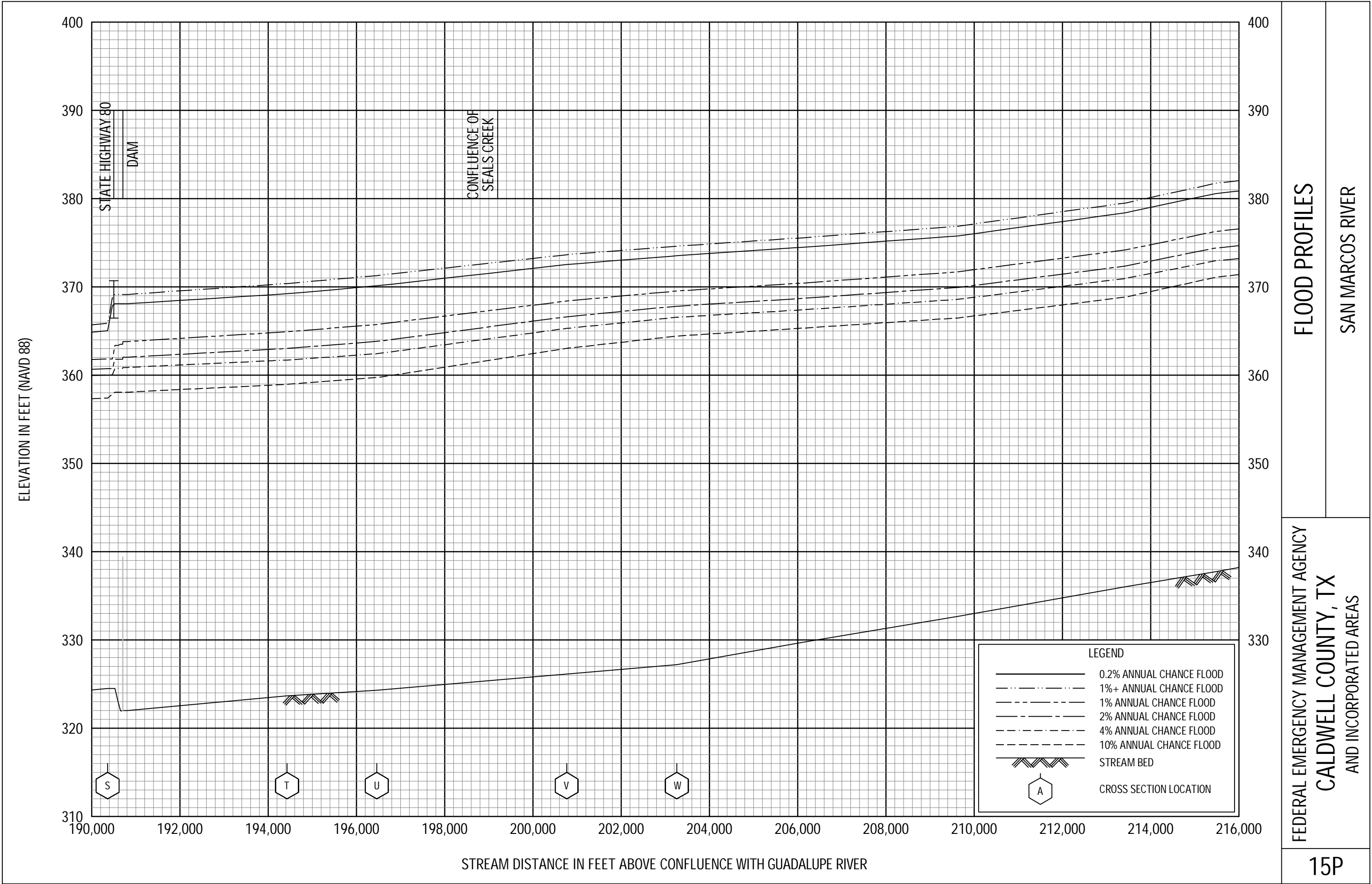
FLOOD PROFILES

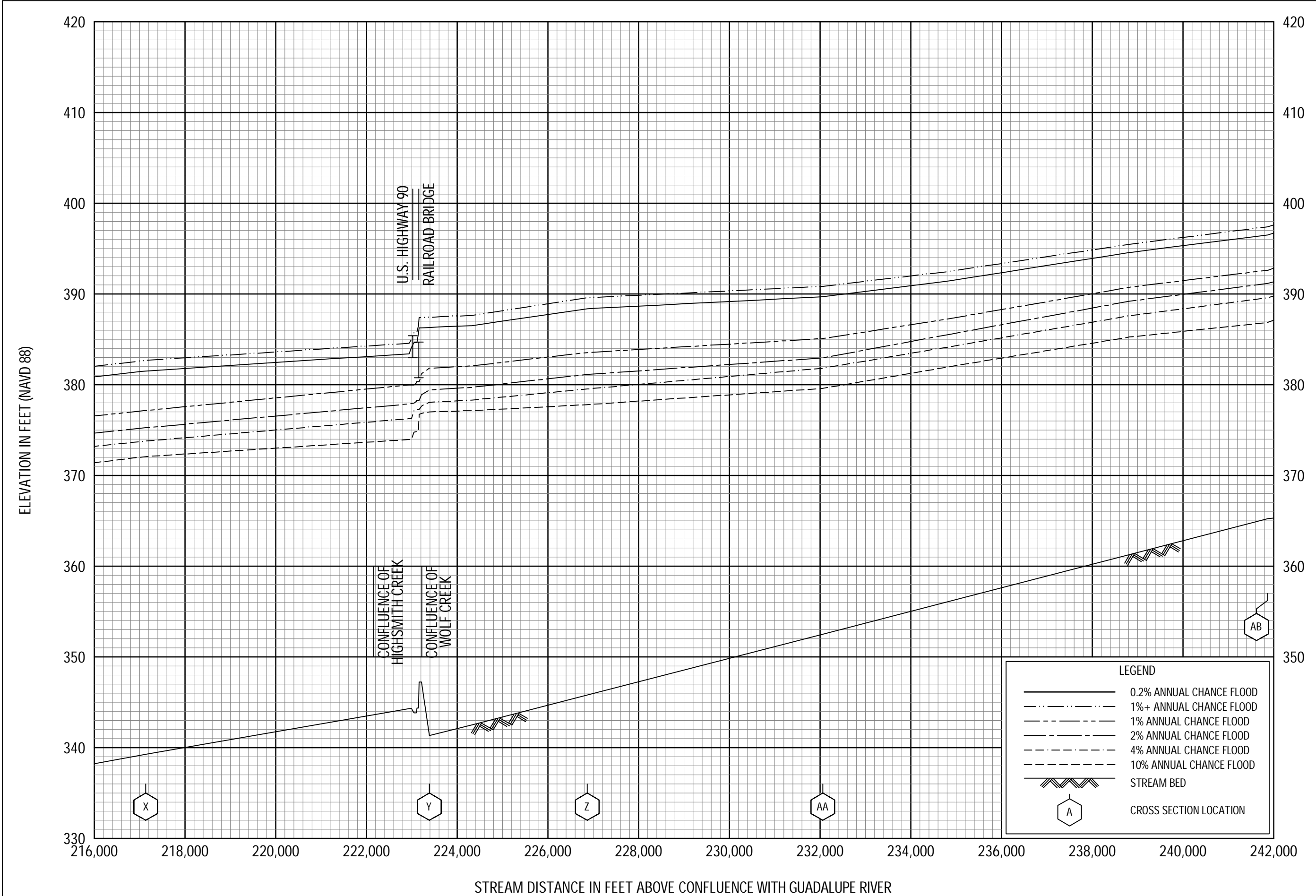
PLUM CREEK

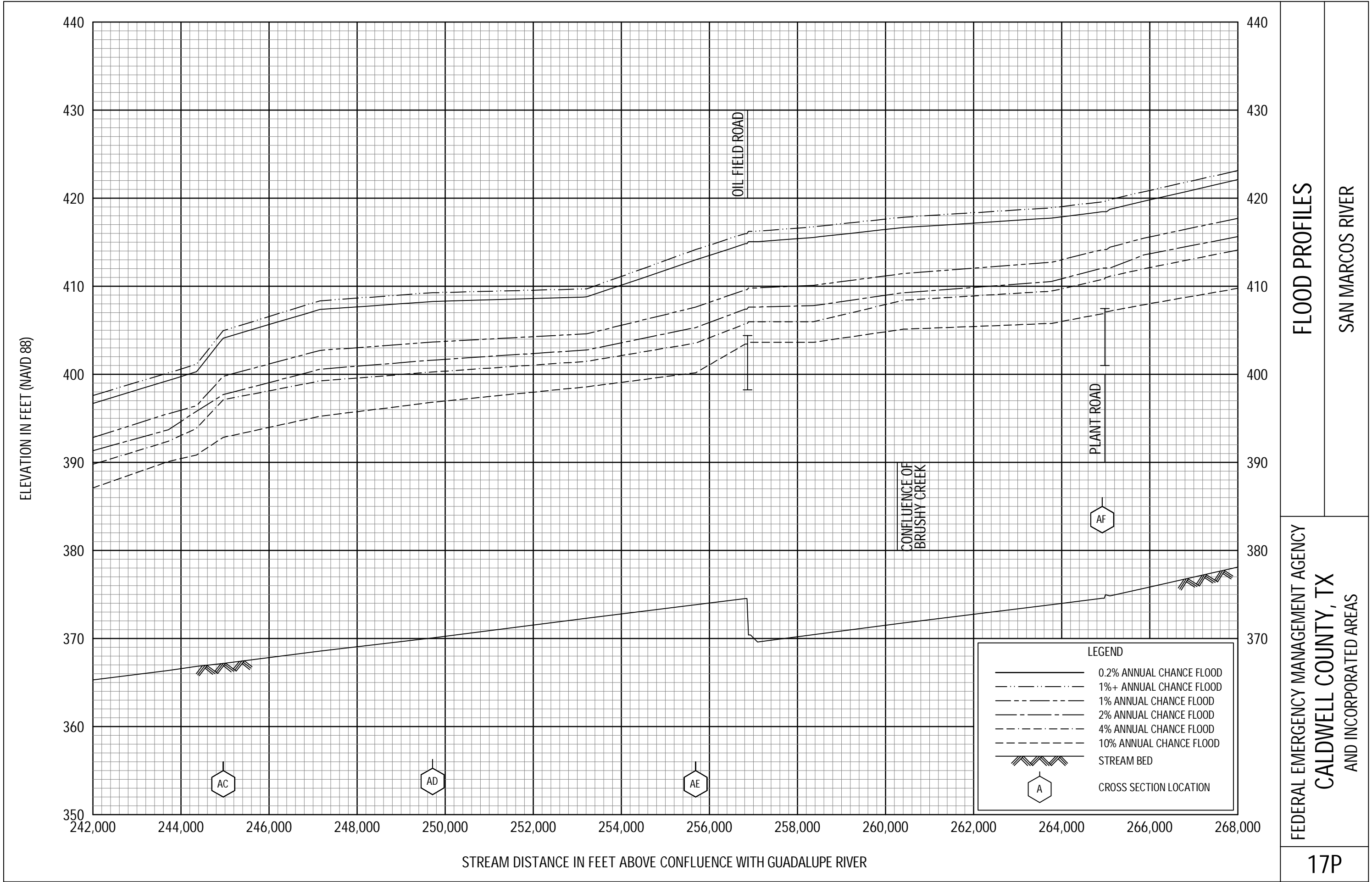
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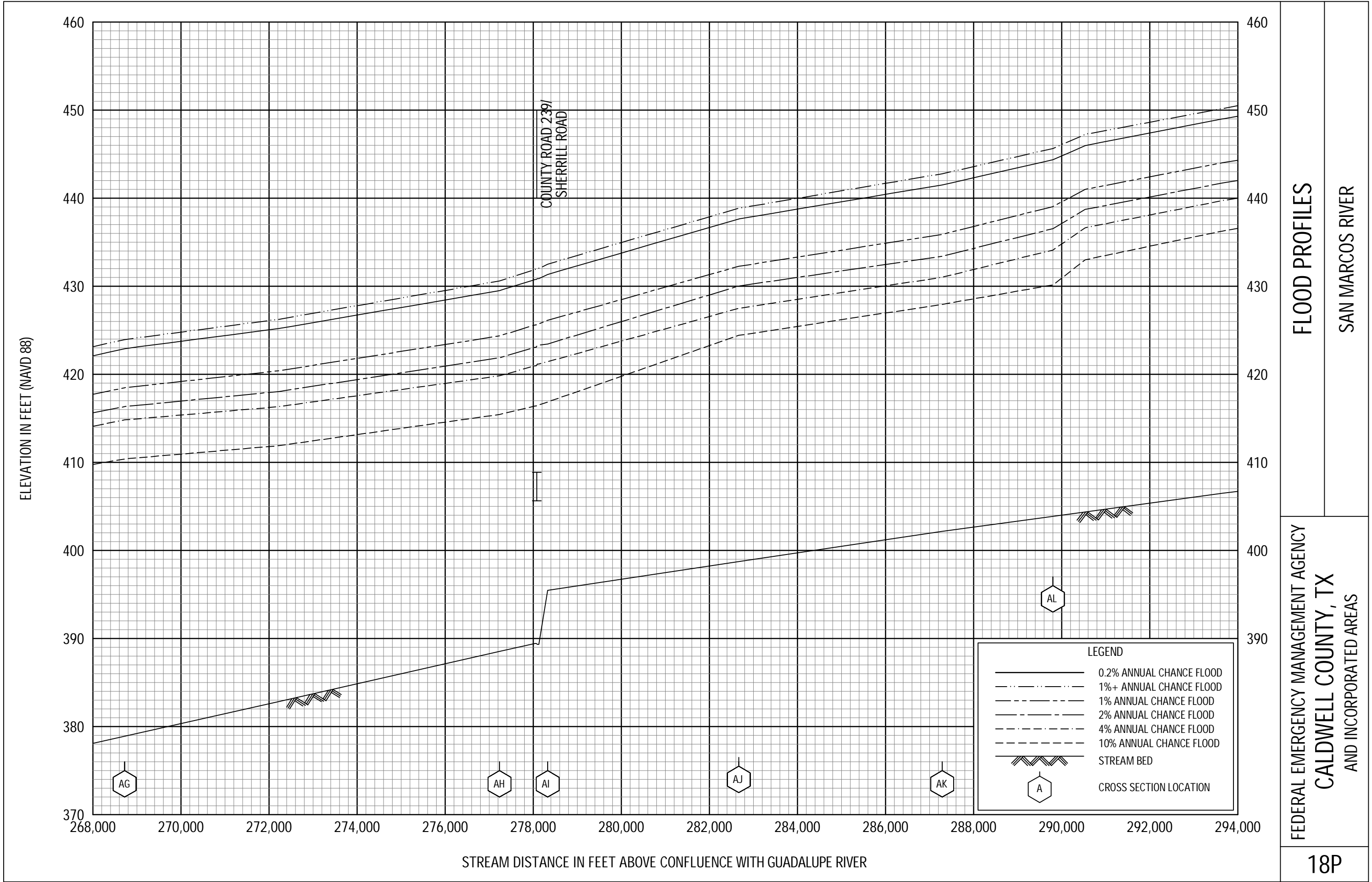








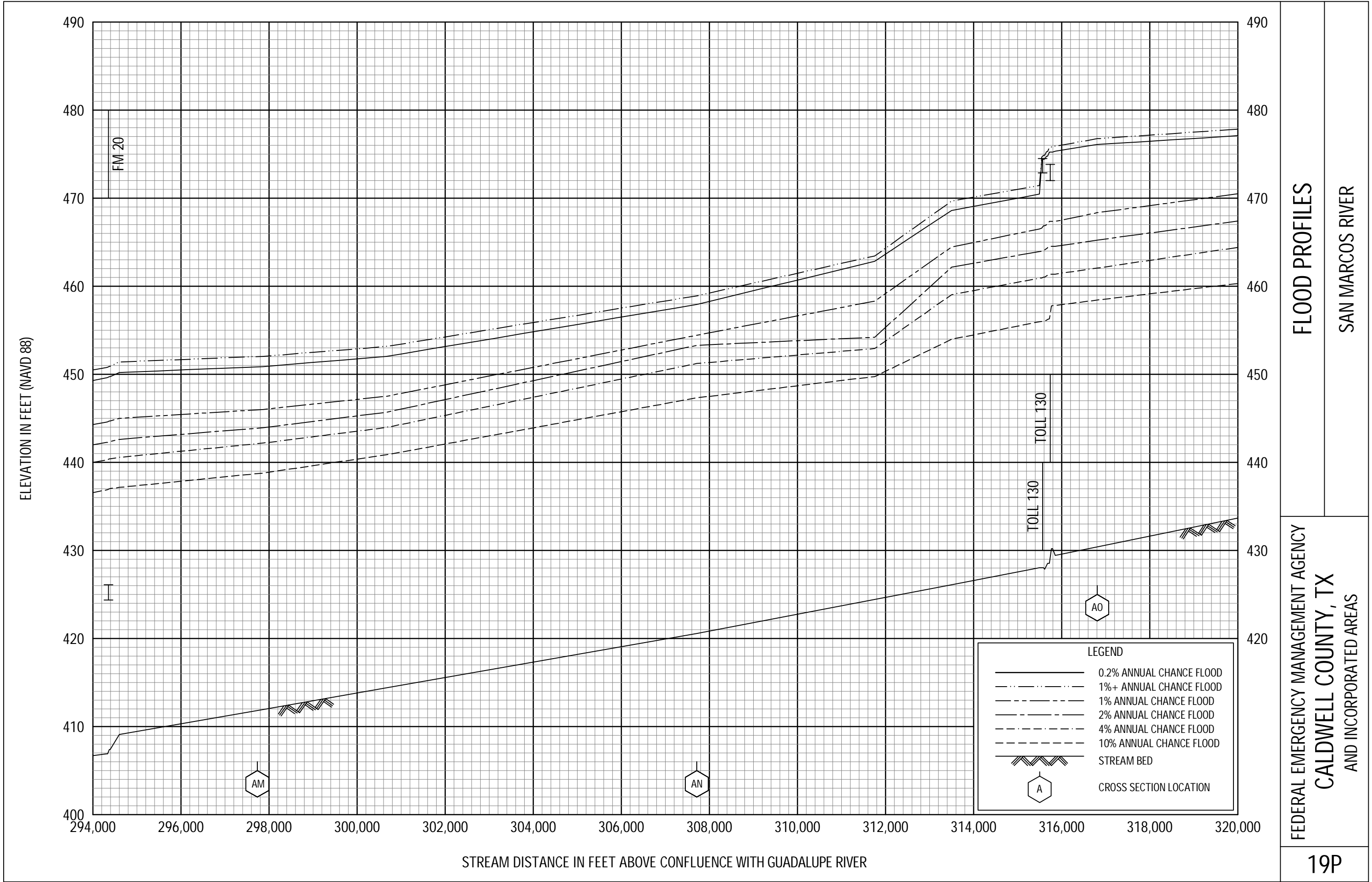


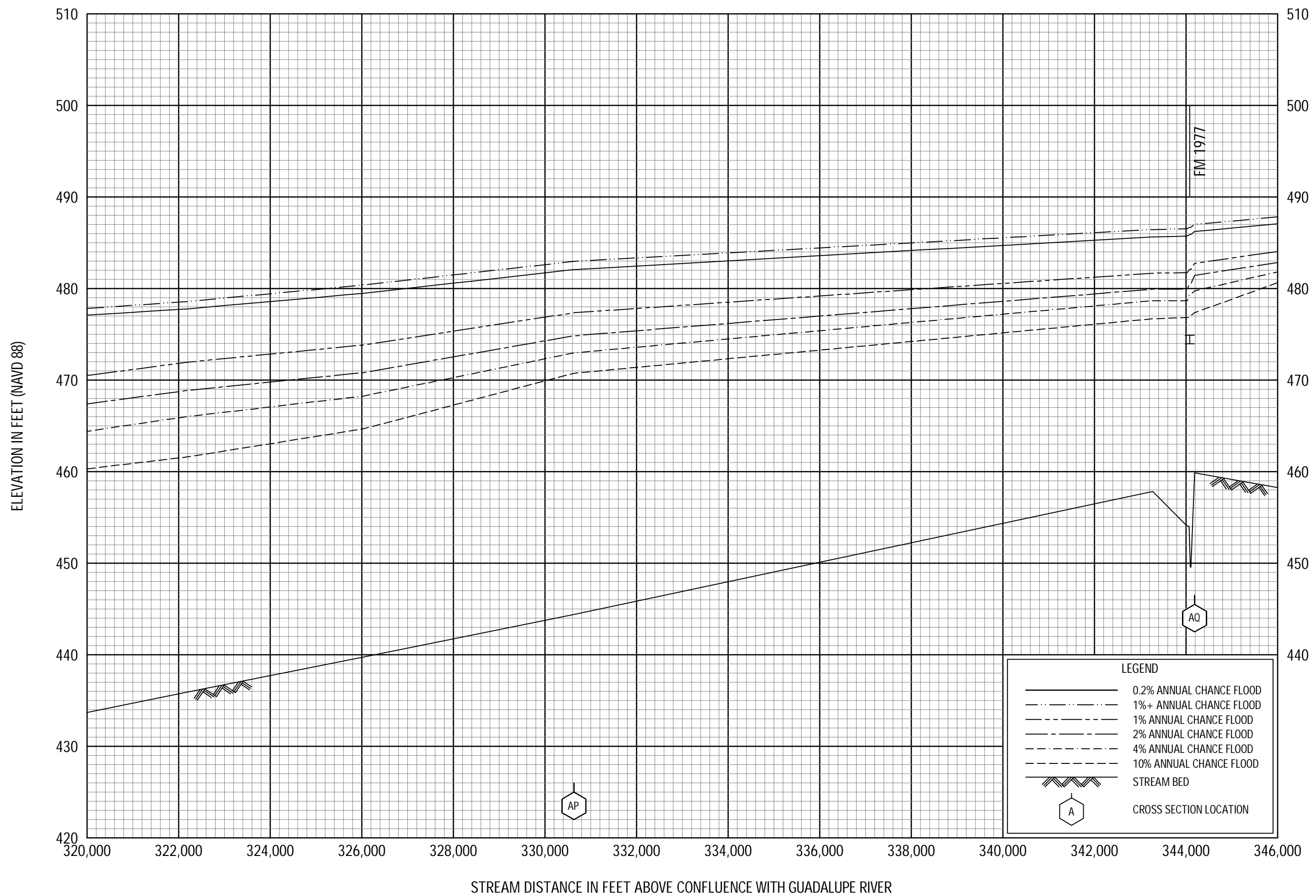


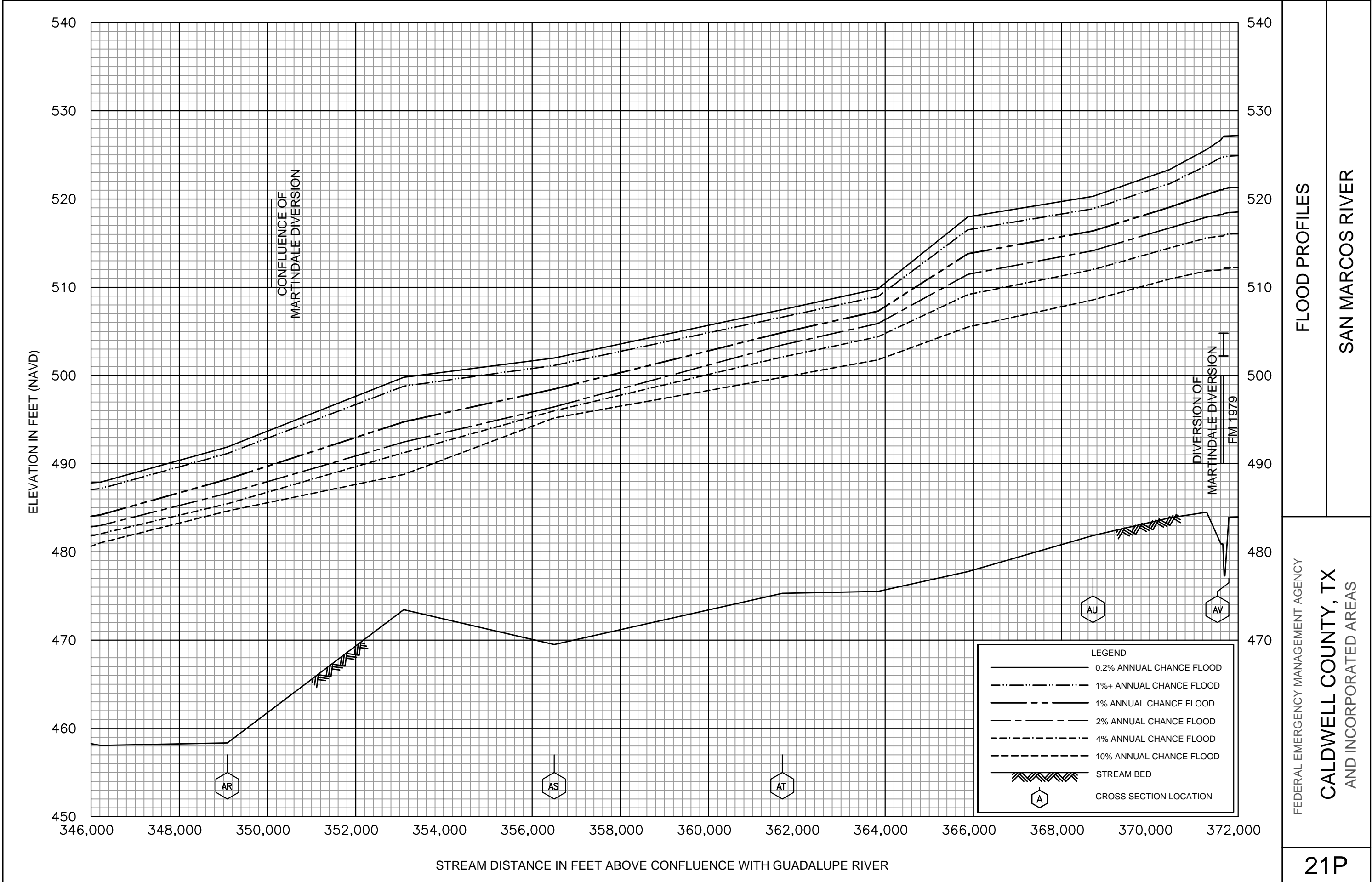
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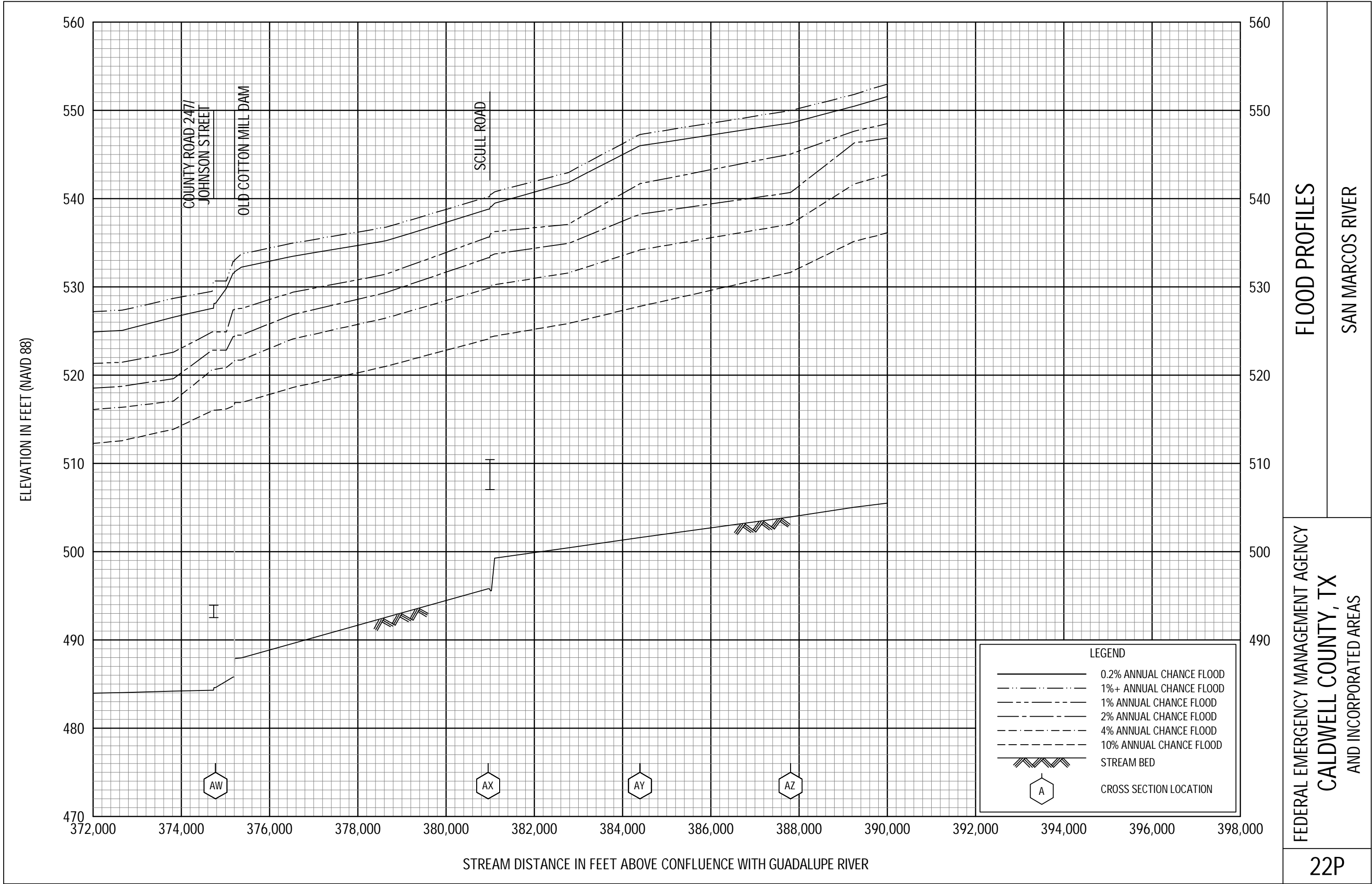
SAN MARCOS RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY  
CALDWELL COUNTY, TX  
AND INCORPORATED AREAS

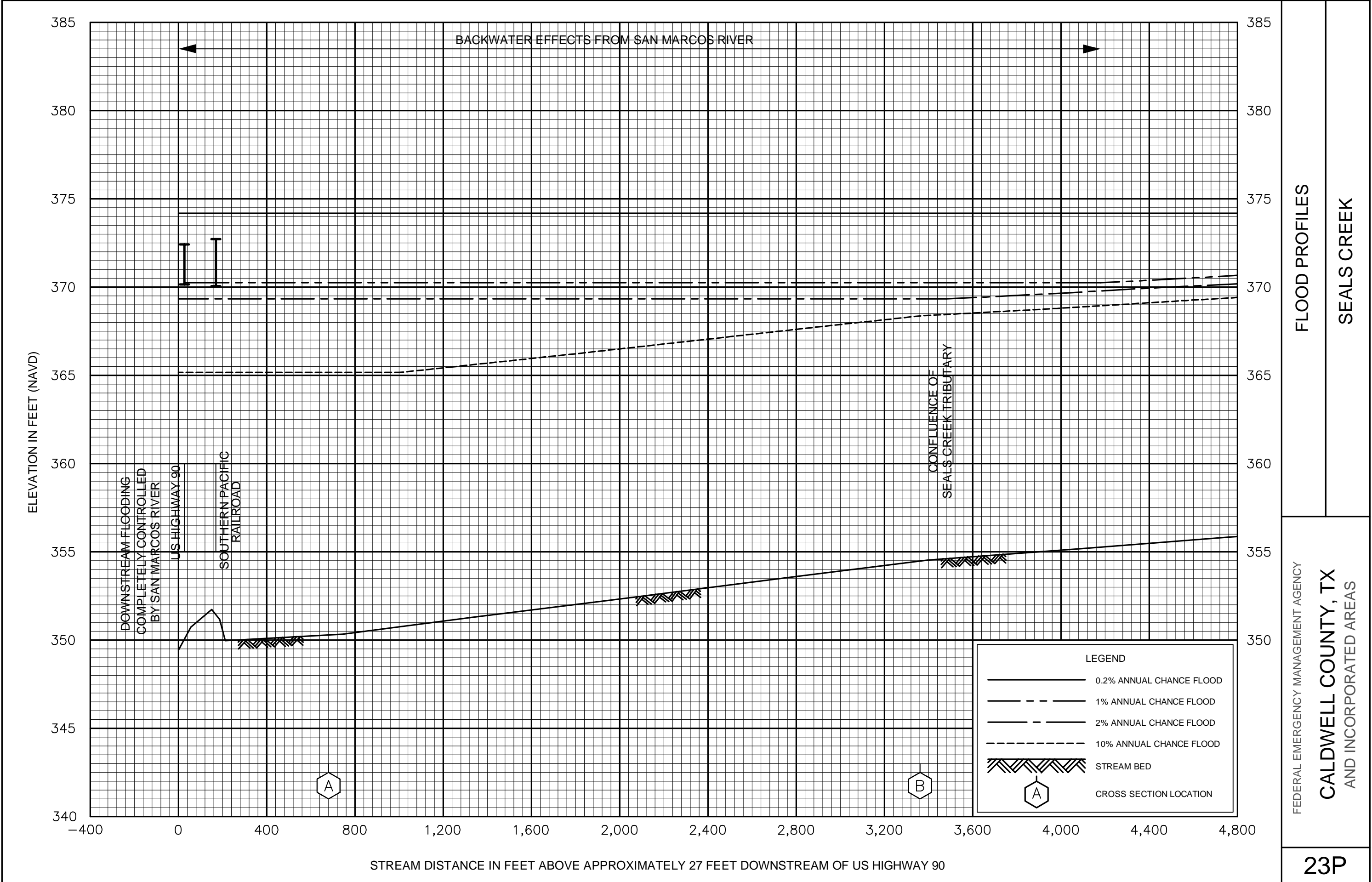










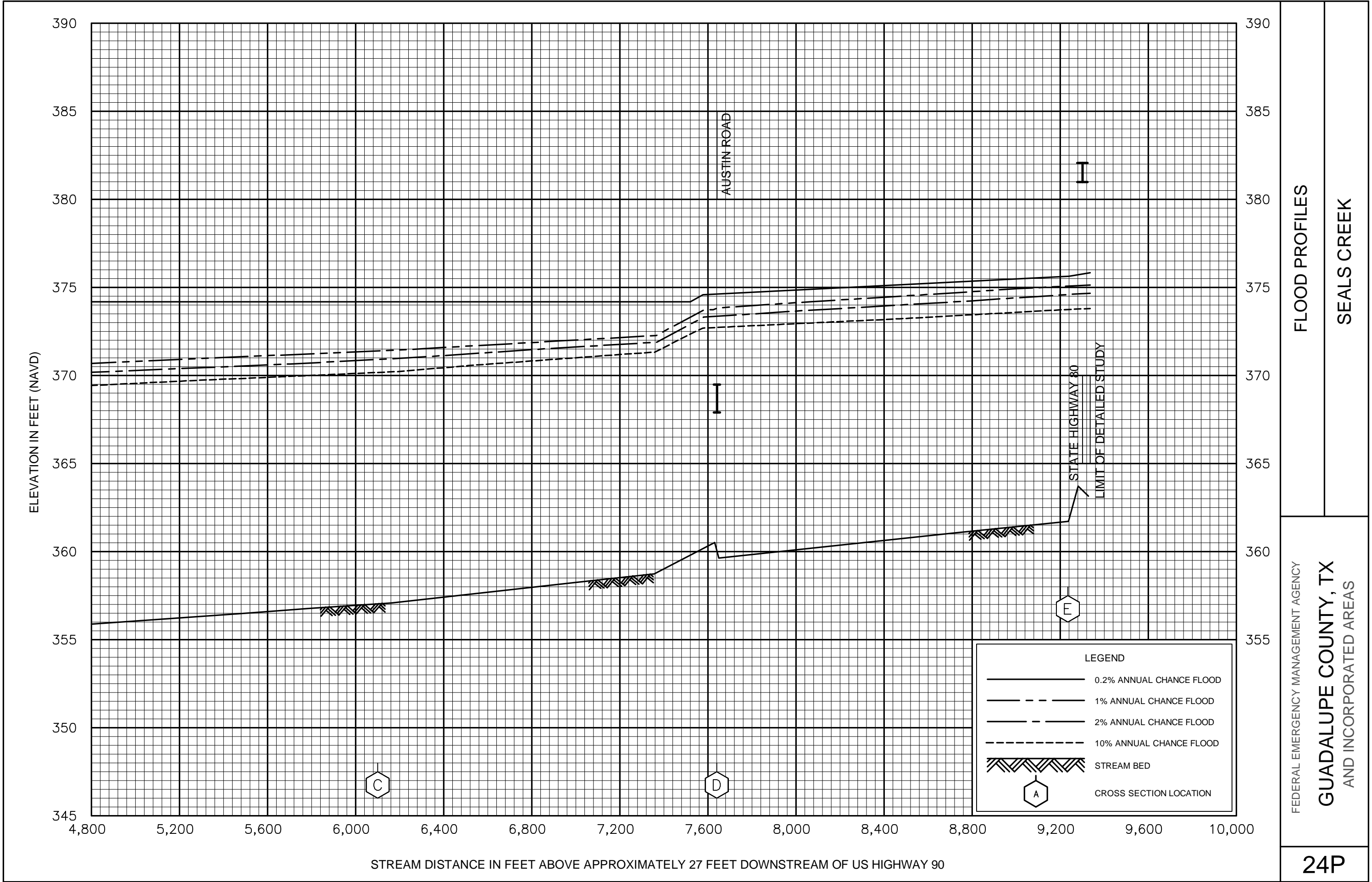


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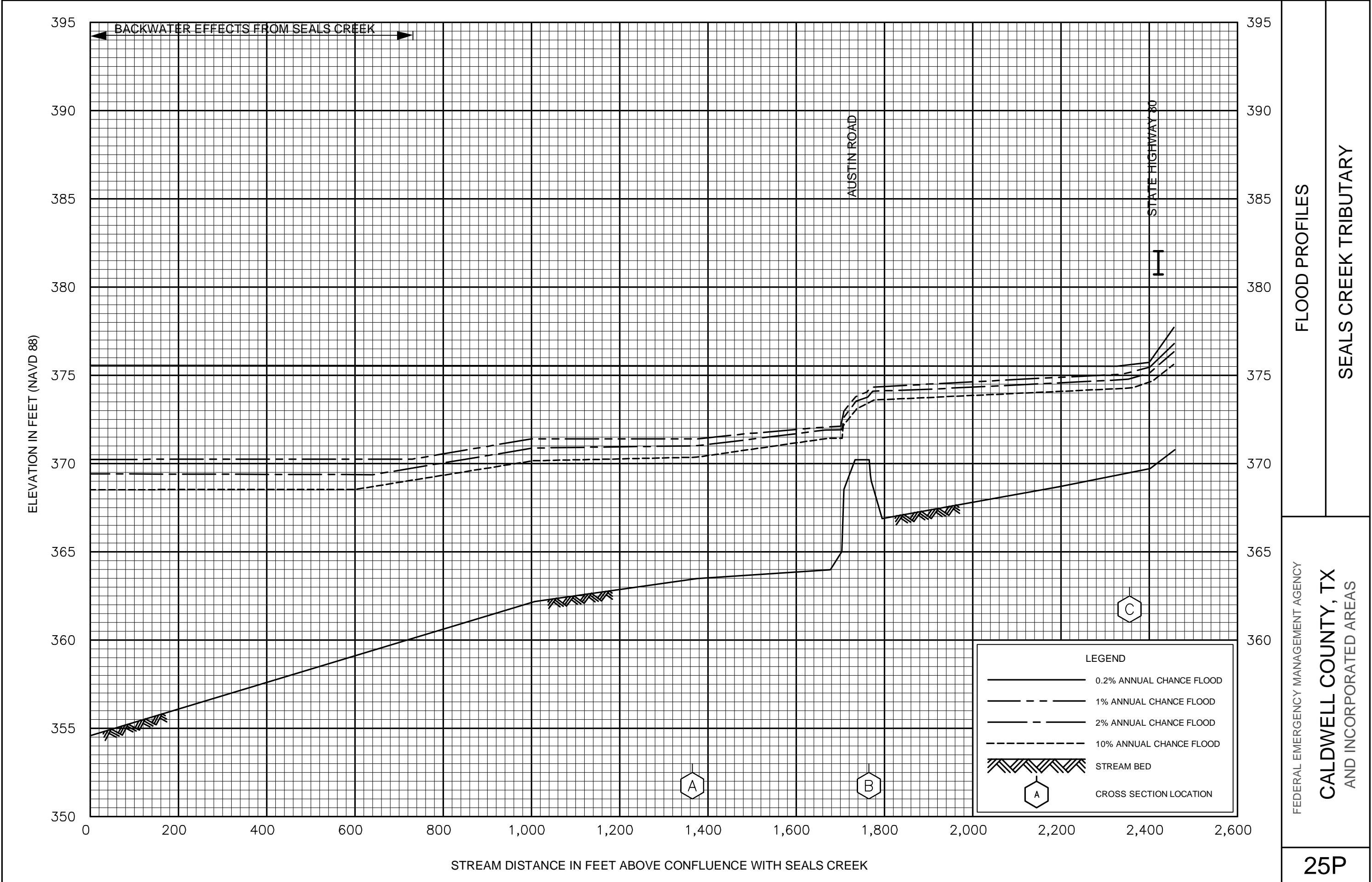
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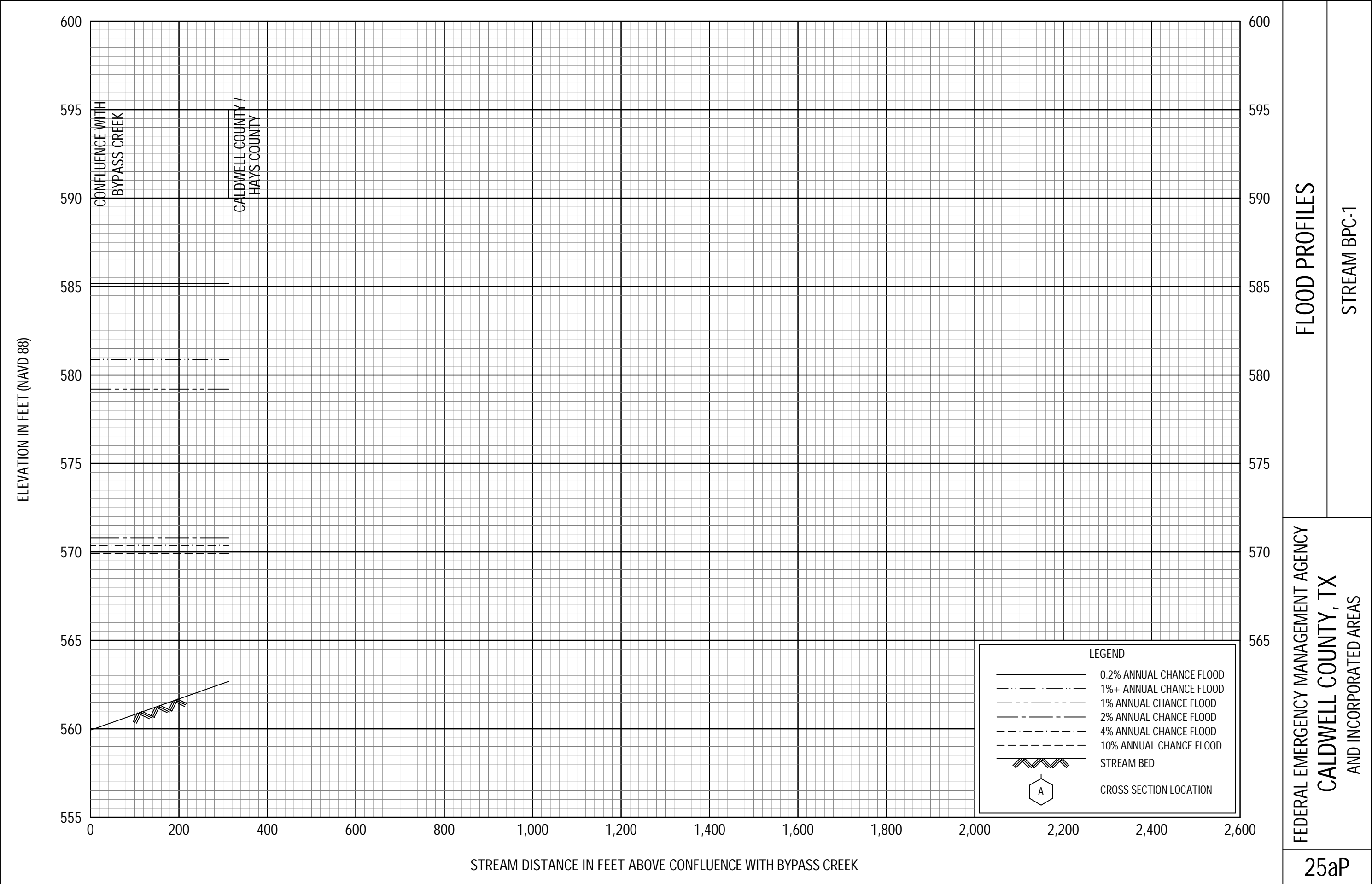
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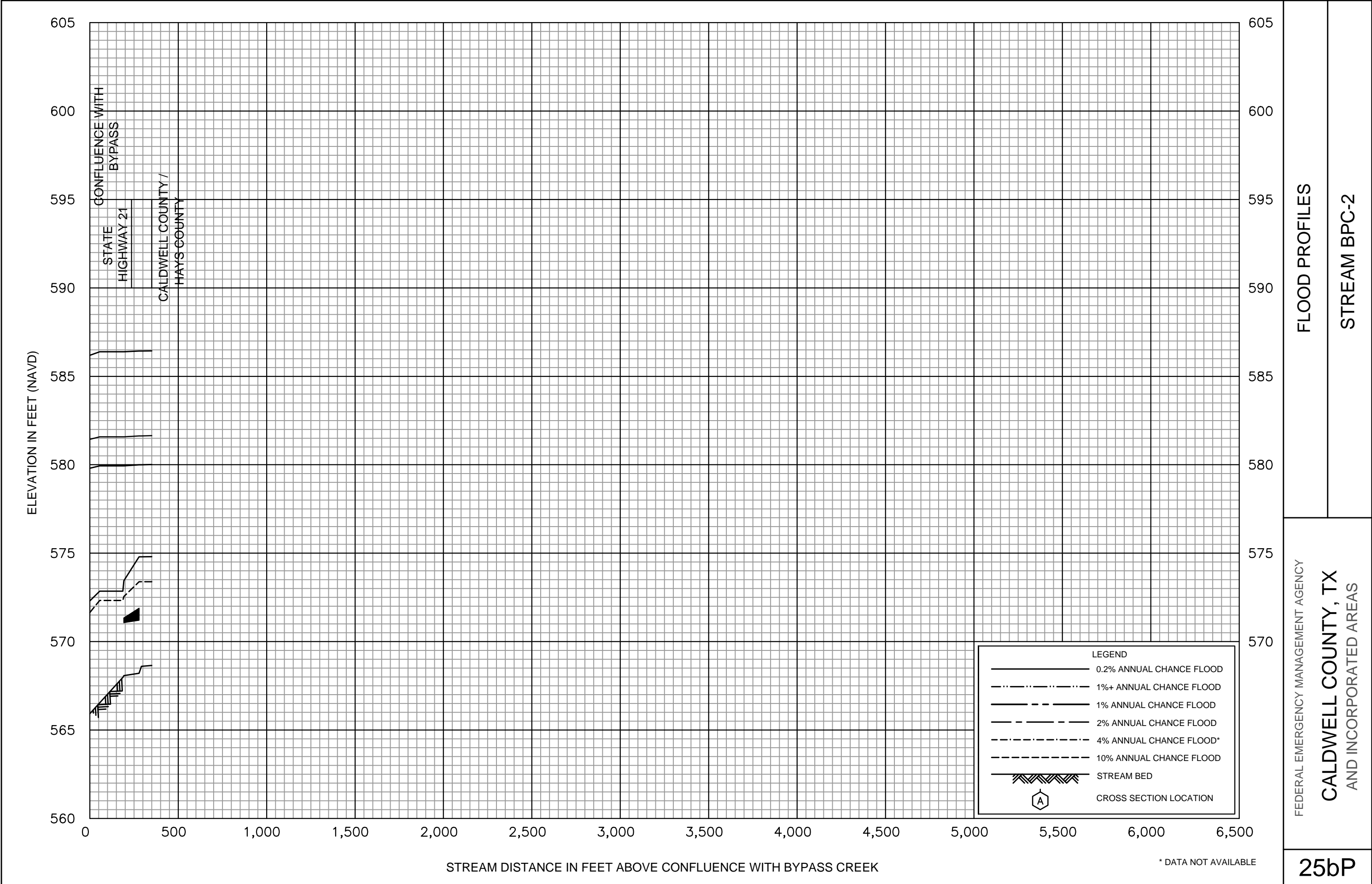
CALDWELL COUNTY, TX  
AND INCORPORATED AREAS











FLOOD PROFILES

STREAM BPC-2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CALDWELL COUNTY, TX  
AND INCORPORATED AREAS









